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# starting **2** points in mathematics teacher's edition



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# Teacher's Edition for

# starting points

# in mathematics

Revised

Mathematics Team

Level 2

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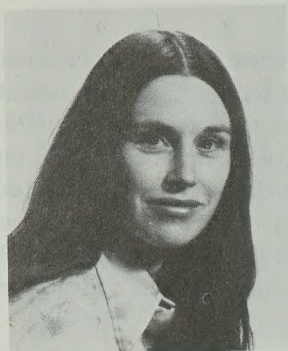
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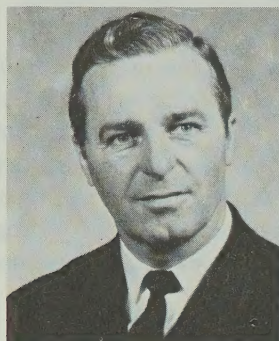


## Authors and Consultants



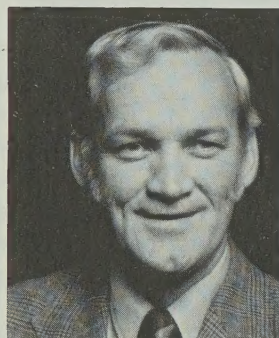
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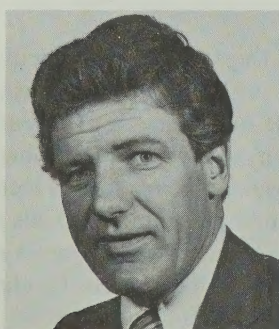
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## Authors and Consultants



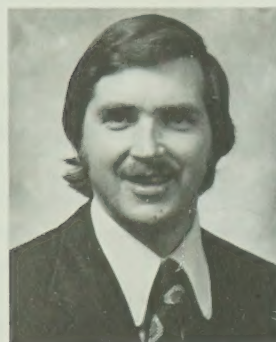
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Stella has a Bachelor of Arts degree from the University of Toronto. Her background in mathematics has included teaching at the secondary level with the Lincoln County and York County Boards of Education. After teaching at the American School in Athens, Greece, she resumed her duties with the York County Board of Education and then joined the North York Board of Education in an advisory position at the junior-high level. More recently she has been a Mathematics Consultant mainly at the elementary level for the North York Board of Education. She has worked on the program in evaluating and writing manuscript, and writing teaching suggestions and activities for the teachers.



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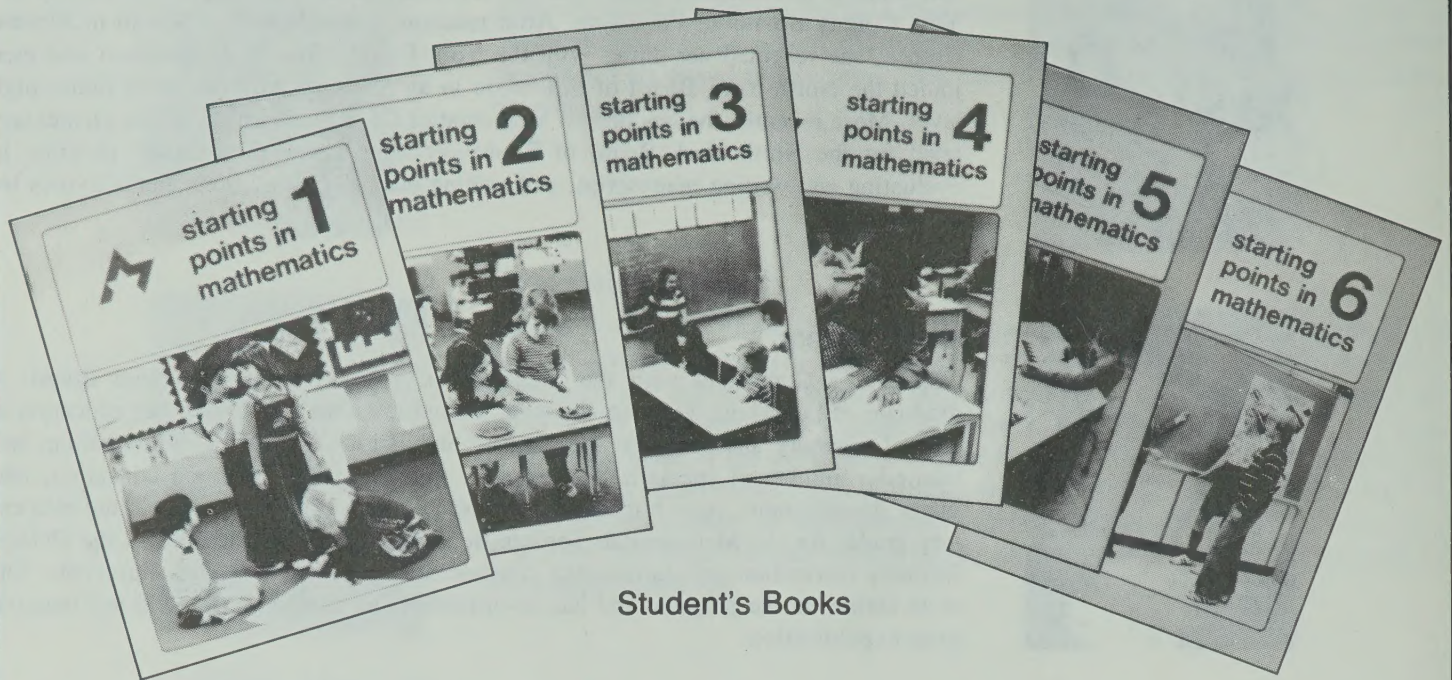


**Mary Wright**

Mary received her education in England and carried on postgraduate work at Acadia University (M.Sc.), and Dalhousie University. She taught high school in England, New Brunswick, Nova Scotia, and Prince Edward Island. She was a lecturer and assistant professor of mathematics at Acadia University for ten years. Currently, she is Mathematics Consultant for the Regional Administrative Office of the Department of Education in Montague, Prince Edward Island. She has been active in mathematics in a number of capacities. She is a recipient of a Canada Council Scholarship for Teachers of Mathematics, and a member of the Canadian Mathematics Congress and of N.C.T.M. She has worked on the Grades 4 to 6 phase of the program in planning its development and evaluating manuscript.

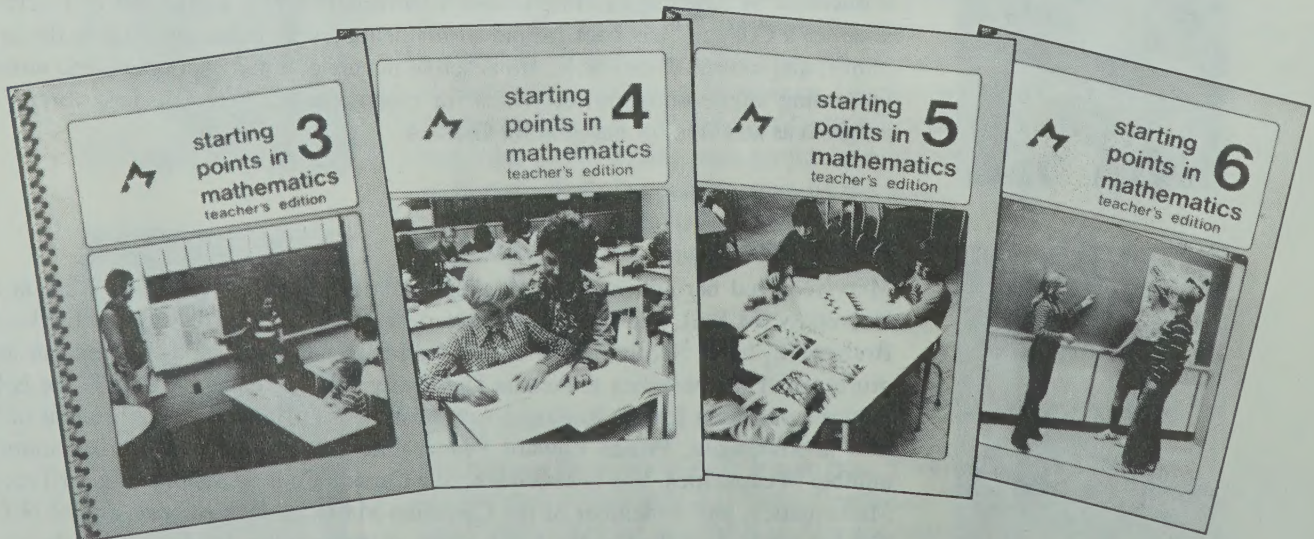
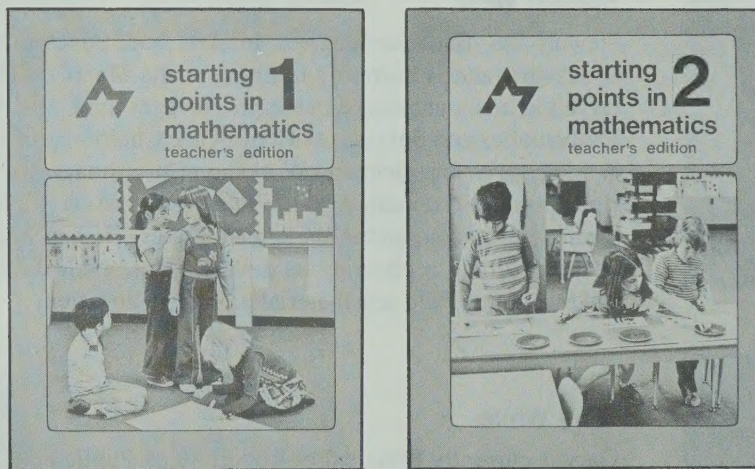


# starting points in mathematics



Student's Books

Teacher's Editions





# Program Highlights

## Content

- Computation strands that maintain a balance between concepts and skills
- A metric Measurement strand using units and symbols in accordance with the National Standards of Canada
- A Decimals and Fractions strand that reflects the more significant role of decimals in a metric world
- A Geometry strand that introduces transformation geometry topics in addition to the more traditional topics
- A Problem Solving strand that identifies specific problem solving skills and strategies
- Lessons on using a calculator to reinforce the understanding of number operations and as an aid for checking results

## Development

- Computational concepts and skills built upon the basic facts, the continued manipulation of concrete materials, place value, systematic development of the algorithms, and practice
- Measurement concepts and skills introduced using non-standard units; refined and developed using only approved metric units
- Decimals introduced with the parts-of-a-whole concept and developed by extending the place-value concepts of whole numbers
- Corresponding ideas among the Numeration, Computation, Measurement, and Decimals strands treated as mutually supportive concepts for both development and reinforcement
- Problem Solving strand integrated with the other strands
- Material provided for maintenance of computational skills

## For the Student

- A highly visual program placing mathematics ideas and experiences within meaningful settings of real-life objects and situations
- Uniform lesson structure with completed examples to illustrate each objective
- A variety of types of exercises
- Problems that provide reasons for learning mathematics
- *Special Features* showing mathematics in use in real-life situations and providing opportunities to be individually creative with mathematical skills in problem solving and enrichment activities

## For the Teacher

- Manageable units for the development of concepts and skills
- Overviews that provide mathematics background and summarize the content of each unit
- Concise statements of lesson objectives
- Suggestions for activities to precede and follow each lesson in the book; suggestions for teaching each lesson in the book
- Uniform lesson structure that is adaptable to a variety of classroom strategies
- Unit themes that support the integration of mathematics with other areas of study, and suggestions on how this integration can be achieved
- Component skills necessary for achieving lesson objectives identified
- Assessment materials included in the book and the teacher's edition



# Features of the Student's Book

A minimum amount of reading is required on each page.

Color and design are used to assist understanding.

Pages are designed to arouse interest and provide motivation.

A worked example indicates how the children are to record their answers.

What coins do you need?

Draw the coins and show how much money is needed to buy each pair of items.

20 (twenty)

Using pennies and nickels, amounts to 9 cents

The student's book can offer only one part of a complete mathematics program. About half the children's time should be spent on activities before and after using the page.

The development of a concept enables the child to move from the use of concrete materials to the use of abstract number sentences and algorithms.

A spiral organization of the contents in the units of the Grade 2 program provides for reteaching and review.



The instructions along the side of a page are for the teacher to use when telling the children what they are to do for that page.

The content caption at the bottom of each page alerts the teacher to the mathematical content presented on that page.

Word problems whose solutions incorporate the skills taught are included.

Frequent practice exercises are provided after understanding has been established.

## Checkup

End-of-unit lessons provide a check of the understanding of the work of the unit.

## Year-End Checkup

The last four pages in the student's book provide a check that concentrates on the major number concepts and operations developed in Book 2.



A lesson outline may include some or all of the following:

- 1 The page reference to the student's book
- 2 The outcome(s) for the lesson
- 3 Some of the materials that would be desirable for introducing and developing the lesson
- 4 A reference to a page that may be copied to provide cutouts for the children
- 5 Mathematical terms used for the first time and other words useful for discussing the development of the topic on the page
- 6 Activities for developing the lesson concepts, and suggestions for introducing new words and symbols
- 7 Suggestions for using the page

1 Page 58

2 LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding two-place numeral, numbers from 10 to 30

5 Vocabulary

names for the numbers to 30, ones' place, tens' place

3 Materials

objects for grouping by tens, number board labelled for displaying tens and ones

9 RELATED ACTIVITIES

- Children may work in pairs for this activity. One child counts out a number of ones (not more than 30), but does not reveal how many to her/his partner. The partner groups the ones into tens and ones, records how many there are, and states the number.
- Prepare work sheets as shown. Have the children group the dots into tens and show the number represented.

10

|  |               |
|--|---------------|
|  | 1 tens 7 ones |
|  | 17            |
|  | 2 tens 4 ones |
|  | 24            |

8

Complete.

| tens | ones |
|------|------|
| 1    | 2    |
| 12   |      |

| tens | ones |
|------|------|
| 2    | 3    |
| 23   |      |

| tens | ones |
|------|------|
| 2    | 8    |
| 28   |      |

| tens | ones |
|------|------|
| 2    | 6    |
| 26   |      |

| tens | ones |
|------|------|
| 1    | 7    |
| 17   |      |

| tens | ones |
|------|------|
| 1    | 9    |
| 19   |      |

| tens | ones |
|------|------|
| 1    | 5    |
| 15   |      |

| tens | ones |
|------|------|
| 3    | 0    |
| 30   |      |

| tens | ones |
|------|------|
| 2    | 4    |
| 24   |      |

| tens | ones |
|------|------|
| 2    | 1    |
| 21   |      |

58 (fifty-eight)

Representing numbers to 30 using tens and ones

LESSON ACTIVITY

6 Before Using the Page

- Rule three columns on chart paper or the chalkboard. Write the numbers from 11 to 20 in the first column. Label the other columns as shown. Give the children objects for grouping by tens. Ask a child to choose a number from the chart. If, for example, 14 is chosen, have the children count out 14 of the items (ones) and then group them to make one group of ten and four ones. (If Base Ten Blocks are used, have the children exchange 10 ones for 1 ten.) Ask how many groups of ten they were able to make.
- Have one child display her/his one ten and four ones for other children to see. You may wish to place them on a number board labelled for tens and ones.
- On the chart for the row for 14, show how to record that there was 1 ten and 4 more ones.

|    | tens | ones |
|----|------|------|
| 11 |      |      |
| 12 |      |      |
| 13 |      |      |
| 14 | 1    | 4    |
| 15 |      |      |

7

Using the Page

- Discuss the first exercise with the children. Ask them why there is a 1 in the tens' place and a 2 in the ones' place. Ask what number is represented. Have them trace over the dotted numerals. Discuss the second exercise and then let the children work independently.

Overviews

The overview at the beginning of each unit includes a list of the outcomes for the developmental lessons in the unit, mathematical background, comments about the content and how the unit fits with the other units in the program, teaching strategies, materials, and vocabulary.

Themes

At the beginning of each unit, activities are suggested for integrating the theme of that unit with language, mathematics, science, social studies, art, movement, and music.



# 1 Page 220

## 2 LESSON OUTCOME

Complete multiplication facts of 2, to  $9 \times 2$

## 3 Materials

number line, work sheet of ten number lines prepared from copies of page T331 for each child

## 9 RELATED ACTIVITIES

- After the children have completed the table at the bottom of the page, ask questions such as "How many wheels are there on two bicycles?" "For ten wheels, how many bicycles are there?"
- Have the children begin a book of multiplication facts beginning with multiplication facts of two. Have them write the basic facts from  $0 \times 2$  to  $9 \times 2$ . Later, multiplication facts of five and ten will be included in the book.
- Have the children complete the cross-number puzzle on page T299.

Start at 0 and jump by twos  
Show nine jumps.

Complete each number sentence  
Use the number line to help.

$9 \times 2 = 18$        $6 \times 2 = 12$        $4 \times 2 = 8$   
 $7 \times 2 = 14$        $5 \times 2 = 10$        $1 \times 2 = 2$   
 $2 \times 2 = 4$        $3 \times 2 = 6$        $8 \times 2 = 16$

Complete

Complete the table

|                  |                   |
|------------------|-------------------|
| $0 \times 2 = 0$ | $5 \times 2 = 10$ |
| $1 \times 2 = 2$ | $6 \times 2 = 12$ |
| $2 \times 2 = 4$ | $7 \times 2 = 14$ |
| $3 \times 2 = 6$ | $8 \times 2 = 16$ |
| $4 \times 2 = 8$ | $9 \times 2 = 18$ |

Complete the table

|                  |   |   |   |   |    |    |    |    |    |
|------------------|---|---|---|---|----|----|----|----|----|
| $0 \times 2 = 0$ | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| $2 \times 2 = 4$ | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |

220 (two hundred twenty)

Multiplication facts of 2

8

## LESSON ACTIVITY

### 6 Before Using the Page

- Review the meaning of the symbol  $\times$ . State a phrase, for example, five sets of two. Have a child write the corresponding multiplication phrase ( $5 \times 2$ ) on the chalkboard and read it. Have another child write the symbol  $=$  and complete the sentence. Use other examples.
- Have the children rote count by twos from 2 to 18. Then tell them that you would like to jump by twos on the number line, starting from zero. Write the sentence  $6 \times 2 = \dots$  on the chalkboard. Ask how many jumps of two you should show on the number line for  $6 \times 2$ . Have the children count the jumps as you draw them. Ask, "What number did we reach?" Have a child complete the multiplication sentence on the chalkboard. Repeat for other examples, including  $1 \times 2$  (one jump of two) and  $0 \times 2$  (zero jumps of two). For  $0 \times 2$ , emphasize that the 0 means that no move is made.



T 284

- Prepare a work sheet showing ten number lines with corresponding sentences from  $0 \times 2 = \dots$  to  $9 \times 2 = \dots$ . Have the children illustrate each on a number line and complete the corresponding sentence. After the children have finished, ask questions of the two types: "How many jumps of two were needed to reach 18?" "How many jumps did you have to show for  $5 \times 2$ ?"
- On chart paper, prepare the following table comparing the number of dimes with the number of nickels. Have the children help to complete the table. Then ask questions such as "How many dimes have the same value as 2 nickels?" "How many nickels have the same value as 6 dimes?"

|   |   |   |   |   |    |
|---|---|---|---|---|----|
| 0 | 1 | 2 | 3 | 4 | 5  |
| 0 | 2 | 4 | 6 | 8 | 10 |

### 7 Using the Page

- Read the instructions with the children. Have them show nine jumps of two on the number line. Ask what number is reached. Have the children complete the multiplication sentences using the number line for help, if necessary. Then have them complete the table at the bottom of the page.

8 Reduced pages from the student's book with answers indicated

9 Suggested activities and games which may be used to reinforce, extend, or enrich a particular topic

10 Illustrations of suggested materials

## Answers

Answers for the exercises are given on each reduced page from the student's book.

## Other Materials

- Games and Teaching Aids
- Pages for Reproduction
- Year-End Evaluation Chart
- Index for Student's Book



## Using the Introductory Material

Knowing what the *Starting Points in Mathematics* program can do and what it cannot do is an important place to begin. There are two features to help you. First, the Scope and Sequence chart shows the content by grade level and allows you to locate particular topics in the overall development. Second, each unit begins with an overview and a suggested thematic approach. The overview summarizes the content of the unit, includes mathematics background for the teacher, and suggests strategies for class organization and teaching.

## Presenting the Lessons

The organization of the teaching suggestions for each lesson has built-in strategies to motivate and teach, and for practice and application. The *Before Using the Page* section contains suggestions to motivate children through activities and, wherever possible, includes a concrete setting as a basis for learning. Teaching strategies are suggested in this section and also in the *Using the Page* section. The student's pages are designed to complete instruction initiated in the preliminary activities, and to assess student learning.

During the learning stage, children will be working with concrete materials and then be brought to the appropriate student's page when ready. The work completed on the student's page will provide a summary of the extent of the learning and indicate a need for reinforcement with extra material.

Reinforcement and enrichment activities are suggested in the *Related Activities* as extensions of the lesson or applications in the form of games.

## Grouping for Instruction

Knowing what to teach is one thing, but knowing how to adapt a program for individual differences in ability and capacity for achievement is the ongoing role of all teachers.

It is possible to work with lower achievers and higher achievers by using the same material but by altering the teaching procedure. Lower achievers, as in other subjects, need a slower pace to provide for maximum use of concrete materials and pictorial representations as well as varied activities to ensure understanding.

With higher achievers you will often wish to move at a faster pace. This does not mean a more rapid movement through the lessons, but rather a change in approach. All children need the benefits derived from the use of concrete materials for both present and future understanding, but higher achievers tend to move more readily from the concrete to the abstract levels of mathematical thinking. They grasp concepts and skills quickly and will benefit from exploration and challenges that will allow them to use and broaden their newly acquired abilities in different situations, as in assisting other members of the class.

Grouping for instruction is dependent on a number of factors, including teacher preference, teaching strategy, social and academic needs of children, abilities and skills of the children, the need to vary instruction, the organization of the classroom. Some possible ways for grouping are given below.

## The Whole Class

Instruction of the whole class is appropriate for the introduction of new topics or class projects.

## Skill Groups

For this grouping the teacher selects children having similar needs for the teaching of a specific skill. When the skill is mastered, the group is dissolved.

## Interest Groups

For this grouping the child chooses to be a member of the group based on interest in the activity being offered. For example, while one concept is being explored by the whole class, a child may have the choice of working at the sand table or with geoboards. Interest groups may be formed for the study of a theme or for a group project. This kind of grouping promotes sharing among the children and offers opportunities for children to display leadership.

## Random Groups

This type of grouping may be as arbitrary as the grouping of all children wearing something red or as open as to include pairs of friends. It is especially suited to situations involving games, experiments, and making things, for example, models of three-dimensional shapes.

Often children may be part of a group, but they may work independently within the group. It is here that the teacher can observe and plan for individual needs. By moving from group to group the teacher can evaluate and assess performance as well as direct and guide learning. Working with a variety of groupings and with individuals within the groups establishes a balance between teaching effectively and satisfying individual needs.

## Providing for Individual Differences

Suggested strategies for motivating, teaching, providing practice, and presenting applications are built into the program. Other strategies may need to be considered for children in a particular class.

The approach to teaching a lesson may be that of teacher direction only or student discovery only, or it may be a combination of the two. These alternatives will accommodate student differences and differences in mathematics topics. Measurement and geometry, for example, provide opportunities for student-discovery lessons. Although some children appreciate opportunities for making discoveries, other children derive greater benefit from interaction with the teacher during the learning process.

## Problem Solving

The problem-solving strand is integrated and interspersed throughout *Starting Points in Mathematics 2*. Problem situations are reviewed informally through activities suggested with concrete materials. In this way, problems involve objects and experiences related to the children's environment. Situations may involve joining or separating actions, or simply a comparison of two groups. Problem situations that are presented pictorially invite oral interpretation and discussion. More formally, word problems are presented along with pictures to minimize the reading skills required. Such problems involve the application of previously learned skills such as addition and subtraction.

The development of the problem-solving strand includes skills and strategies listed below. The material in this strand, however, is by no means exhaustive. Teachers will capture the



right moments in their daily contact with the children to provide the insights and skills to develop problem-solving techniques.

- interpreting illustrated word problems as additive or subtractive
- writing/completing number sentences
- choosing the correct operation
- solving problems involving two steps
- reading/interpreting graphs
- solving problems related to money, measurement, and geometry

## Testing and Evaluation

Formal written tests are unreliable as a means of measuring achievement of young children, because a written test does not indicate the method or process used to obtain the answer to a problem. Oral questioning and observation, particularly in the manipulation of concrete objects, are required to determine the skills and concepts that have been mastered and those that have presented difficulties. This questioning and observation can be a continuous process as the children are engaged in discussion, games, and the many activities suggested for teaching the various concepts and skills. For teachers who also wish to include a more formal method of testing, there is a *Checkup* at the end of each unit consisting of topics such as number concepts and operations that can be tested by the paper-and-pencil-response technique. But here also, a teacher may prefer to give oral instructions and have the children respond orally or demonstrate a physical action of manipulating objects.

If a child is having difficulty with a number or measurement concept, you may wish to determine her/his level of thinking by using one or more of the tests for conservation on pages xvi and xvii.

If evaluation is to be an ongoing process, it is important to keep complete and accurate records of the achievement of each child. A file containing remarks on progress based on the observation of the teacher and samples of the child's work is recommended. The remarks can be dated and are an excellent reference when reporting to parents. The samples of work can be selected by both the teacher and the child. If children play an active part in contributing work that indicates their mastery of a concept, they also recognize that learning is important. This is an essential factor in assuring future success.

The comprehensive evaluation chart on pages T349 and T350 is intended for use at the end of the school year, but it may be adapted for other uses. For example, if the indicated program is too ambitious for all the children in a class, the chart may be used as a guide for obtaining a minimum program or an average program for the children. The format of the chart may also be adapted as a report to show parents the progress their children have made.

You may wish to adopt a code for recording the stages of development in each child's mastery of concepts and skills. Slashes and dots may be used in such a way that a box marked ☐ means that the child has been introduced to the concept or skill; a box marked ☒ means that the child understands the concept or skill; a box marked ☒ means that the child has mastered the concept or skill. Examples are shown below.

|                                |   |
|--------------------------------|---|
| Measures in centimetres        | <input type="checkbox"/> (Exposure)                 |
| Uses extensions of basic facts | <input checked="" type="checkbox"/> (Understanding) |
| Writes numerals to 999         | <input checked="" type="checkbox"/> (Mastery)       |

## A Thematic Approach to Mathematics

In the development of the primary phase of the program for *Starting Points in Mathematics*, each unit has been considered from a thematic aspect. The considerations given to this aspect of curriculum planning did not alter the mathematics, but did provide many opportunities to enhance the teaching strategies.

Teachers who attempt to provide an integrated curriculum frequently encounter difficulty interweaving the mathematics curriculum with other subjects and in creating sufficient real-life situations to make the association a meaningful one. The thematic organization offered in *Starting Points in Mathematics* is provided to assist those teachers who wish to organize their teaching in this manner. The themes in each book have been selected

- to appeal to a wide range of children's interests;
- to provide suitable topics for integrating the curriculum;
- to suggest real-life situations that provide a framework for mathematical understanding.

Teachers who have never tried integrating mathematics may wish to experiment with one or more of the themes suggested. They may be surprised that there are practical aspects in using a thematic approach. For example, time can often be used more efficiently by integrating several subject areas. This approach also facilitates the planning of activities when working within the framework of a topic. Resources and materials required may serve several purposes; for example, art materials may be used as a method for communicating mathematical concepts.

The themes are prevalent in the visual material shown in each unit. Where possible, the concrete materials used in the teaching of a concept are chosen to fit the theme; but certain topics, such as measurement and geometry, did not always lend themselves to a particular theme. In addition to this visual link, the introductory material for each unit offers suggestions on how to integrate the theme of that unit with the following subject areas:

Language  
Mathematics  
Science  
Social Studies  
Art  
Movement  
Music

Representative activities are given for each subject area. These may suggest ideas for other activities that will appeal to the children. The children may also make suggestions for activities they wish to explore. Involving the children in planning the activities within a theme is a valuable learning experience for them, and enables the teacher to observe and assess each child's development.

The themes for *Starting Points in Mathematics 2* are listed below.

| Unit | Theme            | Unit | Theme            |
|------|------------------|------|------------------|
| 1    | Arts and Crafts  | 7    | Transportation   |
| 2    | Harvest          | 8    | Neighborhoods    |
| 3    | Wildlife         | 9    | Plant Life       |
| 4    | Fantasy          | 10   | Prehistoric Life |
| 5    | Sports and Games | 11   | Pioneer Days     |
| 6    | Collections      | 12   | Across Canada    |

It is hoped these twelve themes will provide a teaching strategy that will lead the children to greater understanding and enjoyment of mathematics.

## Testing for Conservation

Conservation can be thought of as the property of remaining unchanged in different situations. For example, the length of a pencil remains the same whether it is positioned horizontally, vertically, or obliquely. Although this concept is obvious to adults it is another matter altogether for young children. To a young child, the simple act of pouring an amount of liquid from a short, wide container into a tall, narrow container intuitively seems to increase the volume of liquid. Thus, young children are not like adults in their thinking, in that they rely heavily on perception.

It must be kept in mind that one cannot “teach conservation” to children. An understanding of the concept of conservation comes at a particular stage in a child’s mathematical development. For teachers of young children, it is important to know at what level a child is thinking, in order to be able to provide experiences that will assist the child in moving away from intuitive thinking and toward operational thinking, which involves a greater degree of mental activity.

In considering how to determine a child’s level of thinking, we may refer to the work of Jean Piaget. In his extensive research into how children think, Piaget devised a number of tasks for children. These are carried out on an individual basis with each child and the child’s responses to certain questions reveal how he/she sees objects and situations. Several tasks are described here, but it must be pointed out that since the objective is to determine how the child observes certain situations, there must be no attempt to sway the child’s thinking while he/she answers the questions.

**Number:** By the time most children begin school at four or five years of age, they are able to recite the sequence of counting numbers from 1 to 10. However, the ability to rote count can be misleading because it suggests an understanding of numbers. It has been said that reciting number names in order has about the same relation to mathematics that reciting the alphabet has to reading. Although children may be able to recite the number names in order, they may have difficulty assigning them correctly to sets of objects. Frequently, in counting objects, they will count an object more than once or perhaps skip it altogether. Thus, a child may not recognize that counting objects involves ordering them as well.

Once a child can count the objects in a set without difficulty, it is important to find out whether he/she understands the concept of conservation of number. That is, that the number of objects remains the same regardless of the spatial arrangement.

Place eight red blocks and eight blue blocks on a table. Ask the child to match the red blocks and the blue blocks one to one. Ask if there is a red block for each blue block. Then ask if there are as many blue blocks as red blocks.



As the child watches, spread the set of blue blocks apart. Ask again whether there are as many blue blocks as red blocks or whether there are more blue blocks than red blocks.



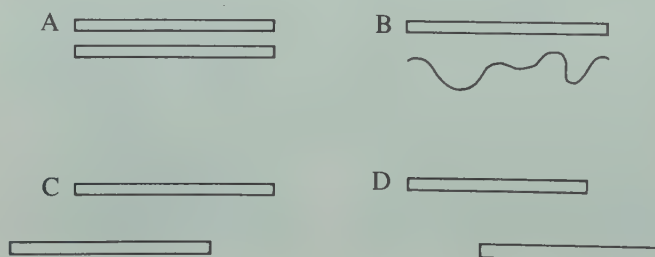
If the child answers that there are still as many blue blocks as red blocks, ask the child how he/she can tell. You may repeat the test using a greater number of blocks of each color, say, 10 or 12, to see whether that child can conserve number at this new level. If, however, the child replies that there are more blue blocks when they are spread apart, do not pursue the matter or attempt to have the child alter her/his answer. It would be preferable to return to the problem after the child has had more experiences with counting activities similar to those described below.

- This activity may be carried out with a small group of children, say, five. Have the children sit in a circle and have each child hold an object such as a block or a bead. Designate one child as being first. Each child in turn places her/his block in a box in the centre of the ring as the children count aloud. When all the blocks have been placed in the box, ask the children to predict how many blocks there will be in the box when it is emptied for counting. Take the time to have each child whisper her/his answer in your ear before you empty the box and count together. Then repeat the procedure, choosing a different child to be first.

- Ask the child to count five beads into a box. Place a cover on the box and shake the box. Remove the cover and ask the child how many beads there are now in the box. A child who understands conservation will reply “five” immediately and wonder why you have asked for such an obvious answer. A child who counts the beads again before saying “five” should repeat this kind of activity at different times until he/she appears to show an understanding of five. You may prefer to begin this activity with fewer than five beads.

- Have the child count five beads into your hand. Shake them first and then place some in one hand and the rest in the other hand. Have the child tell you how many beads there are all together. Observe whether the child must count the beads again before saying “five”. Repeat the procedure several times with different numbers of beads.

**Length:** Young children see length in terms of end points rather than as a property that an object possesses. That is, if the end points of two objects are aligned, they would be considered as having the same length. This concept is correct for the two sticks (A) but incorrect for the stick and the string (B). Also, when two objects are positioned so that their end points are not aligned (C), children may consider them as having different lengths.





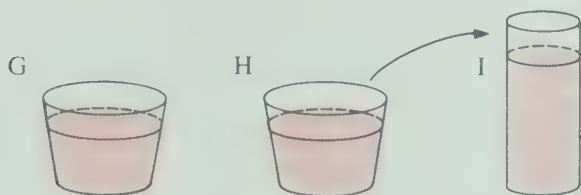


Select two sticks (pencils, strips of paper) of equal length and ask the child to show that they have the same length. This will likely be done by placing them together and observing that their end points are aligned (A). As the child watches, move the first stick to a new position (C, D, E, or F). Ask questions to determine whether the child thinks that one stick is longer than the other or that the two sticks have the same length. Return the stick to its original position (A) and repeat the questions.

If the child demonstrates that he / she can conserve length for this first situation, you may continue the test by moving the sticks in different directions, or by repeating the test for two pieces of string having the same length. However, if the child sees the relationship between the lengths as a changing one, it would be best to delay further comparisons until a later time.

**Quantity:** Since children rely on perception in their thinking, it is no wonder that they associate the volume of a liquid with the shape of the container. Present a child with two equal quantities of juice, one in a short, wide container, the other in a tall, narrow container; and the child will invariably select the tall, narrow container because it appears to hold more juice.

Place two identical glass containers (G, H) on a table and assign the child the task of pouring the same amount of liquid from a jug into each container. This can be a time-consuming task since many children make a painstaking attempt to be accurate, but the procedure is an important one in terms of the rest of the test.

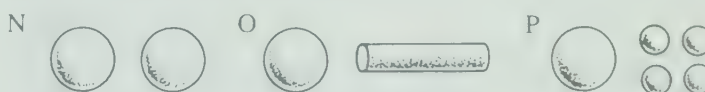


When the child is satisfied that the two containers have the same amount of liquid, carefully pour the contents from one container (H) into a tall, narrow container (I). Ask questions to determine whether the child thinks that of the two containers (G and I) one container holds more liquid than the other or the same amount of liquid. Carefully pour the liquid back into the second container (H) and repeat the questions. Children who do not yet understand conservation of volume will see the liquid as changing to "more than" in the taller container and returning to "the same as" in the shorter container.

**Mass:** To a young child, changing the shape of an object results in a change in mass. For example, Plasticine molded in the shape of a sphere (J) will appear to change in mass if it is rolled into the shape of a cylinder (K), a ring (L), or squashed to a shapeless lump (M); and will appear to contain more Plasticine than the original shape.



Have the child use the balance scales and Plasticine to make two balls of equal mass (N) and then remove them from the scales. Ask whether there is more Plasticine in one ball than in the other or whether there is the same amount of Plasticine in the two balls. The child will likely say that they have the same amount since they have just been made that way. Have the child change the shape of one ball by rolling it into a cylindrical shape (O). Ask whether there is the same amount of Plasticine in the cylinder as in the ball or whether one has more Plasticine than the other. Ask the child to give a reason for her/his answer. Finally, have the child roll the cylindrical shape into a ball again and repeat the question. Depending on the answers given, the test may be extended so that one of the balls is changed in a variety of ways, including dividing it to make two or more smaller balls (P).



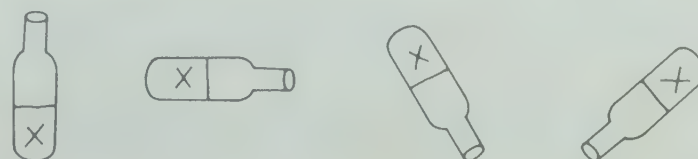
The two balls of equal mass (N) may be used for a test for conservation of displacement of volume.

Present a child with two equal quantities of water in identical transparent containers (Q) and the two Plasticine balls of equal mass. Ask the child to place one ball in each container. Note that the water rises to the same level in each container (R). Remove the ball from one container and have the child roll the Plasticine ball into a cylindrical shape as before (O). Ask whether the water will rise to the same level as the water in container S when the cylindrical shape is placed in container T.



**Horizontal Position:** Although this concept is not one of conservation, it is nevertheless an interesting one and can provide an insight into the child's level of thinking. Consider the question, "How does the liquid in a bottle behave as the position of the bottle is changed?"

In his work with children, Piaget had them consider this problem in the following way. A child was shown a bottle partially filled with liquid on a level surface and then the bottle was concealed in a bag. The bottle was held in a different position and, on a drawing representing the bottle, the child was asked to draw a line to show where the water came to and to mark an X to indicate the water. In view of some of the typical responses shown below, it is no wonder that so many spills occur when young children are holding containers of liquid.



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# Scope and Sequence

|                               | Grade 1  | Grade 2  | Grade 3   |
|-------------------------------|--|--|---|
| <b>NUMBER AND NUMERATION</b>  | Read, write numerals from 0 to 99<br>Place value for two-digit numbers<br>Count, order, compare numbers to 99<br>Ordinal number concepts to <i>ninth</i>   | Read, write numerals from 0 to 999<br>Place value for three-digit numbers, regrouping between tens and ones<br>Order, compare numbers to 999<br>Ordinal number concepts to <i>tenth</i>                                      | Read, write numerals from 0 to 9999<br>Place value for four-digit numbers, regrouping among the places<br>Compare, order numbers to 9999<br>Expanded form<br>Ordinal number concepts to <i>thirty-first</i>   |
| <b>ADDITION</b>               | Basic facts, sums to 10 (11, 12 optional)<br>Order of addends; grouping of addends<br>Related addition, subtraction facts<br>Algorithm with two and three addends, sums to 10 (to 12 optional)<br>Write addition sentences | Basic facts, sums to 18<br>Families of related basic facts<br>Algorithm with regrouping, sums to 99<br>Algorithm, sums to 999<br>regrouping ones (optional)<br>Add amounts of money, sums to 99¢<br>Add to check subtraction | Algorithm, three-digit addends, four-digit sums<br>Algorithm with three addends<br>Add amounts of money, sums less than \$50.00<br>Add decimal tenths   |
| <b>SUBTRACTION</b>            | Basic facts, minuends to 10 (11, 12 optional)<br>Related subtraction, addition facts<br>Algorithm, minuends to 10 (11, 12 optional)<br>Write subtraction sentences   | Basic facts, minuends to 18<br>Families of related basic facts<br>Algorithm with regrouping, minuends to 99<br>Algorithm, minuends to 999<br>regrouping tens (optional)<br>Subtract amounts of money, minuends to 99¢        | Algorithm, four-digit minuends, three-digit differences<br>Check by addition<br>Subtract amounts of money, minuends less than \$50.00<br>Subtract decimal tenths  |
| <b>MULTIPLICATION</b>         | Count by 2's; by 5's; by 10's<br>Readiness for facts of 2  | Facts of 2, 5, 10<br>Write multiplication sentences  | Basic facts<br>Write multiplication sentences<br>Order of factors<br>Related multiplication, division facts<br>Algorithm, two-digit multiplicand, one-digit multiplier  |
| <b>DIVISION</b>               | Separate into two equal groups   | Group to show halves, thirds, fourths, tenths<br>Group by 2's, 5's, and 10's   | Basic facts<br>Write division sentences<br>Related division, multiplication facts<br>Introduction to algorithm, remainders  |
| <b>DECIMALS AND FRACTIONS</b> | One-half, one-fourth of a whole<br>One-half of a set   | Halves, thirds, fourths, tenths of a whole<br>One-third, one-fourth of a set   | Mixed form with halves, thirds, fourths, tenths for wholes and parts of wholes<br>Halves, thirds, fourths, tenths of a set<br>Decimal tenths and hundredths of a whole<br>Place value for decimal tenths<br>Compare, order decimal tenths<br>Add, subtract decimal tenths |



## Grade 1

### PROBLEM SOLVING

Draw pictures  
Complete and write number sentences for picture and word situations  
Choose the operation needed, addition or subtraction  
One-step computations, addition or subtraction

### MEASUREMENT

Comparisons  
Money: penny, nickel, dime, quarter; value of dimes to 90¢, coins to 50¢  
Time: parts of day, hour, half-hour, days of week, calendar for current month  
Non-standard units of length, capacity, mass, and area  
Use the metre stick

### GEOMETRY

Classify, sort according to common characteristics  
Identify triangles, squares, circles, rectangles  
Copy and make shapes  
Copy and continue patterns; make designs  
Recognize three-dimensional shapes  
Recognize and show line symmetry

### GRAPHING

Complete and interpret bar graphs

## Grade 2

Manipulate sets of objects  
Complete the concluding statement incorporating the answer  
One-step and two-step computations: addition and / or subtraction

Money: amounts to \$1.99  
Time: quarter hour, five-minute marks, intervals of one minute, calendar  
Read, record temperature  
The metre, decimetre, centimetre; the litre; the kilogram  
Estimate length, mass, capacity  
Count for area and volume  
The distance around a shape

Match identical shapes  
Know properties of two-dimensional and three-dimensional shapes  
Identify shapes having line symmetry  
Slide, turn, and flip shapes

Complete and draw bar graphs  
Interpret pictographs

## Grade 3

Draw pictures and diagrams  
Multiple-step solutions: addition, subtraction, comparison  
Write concluding statements  
Identify relevant, irrelevant, missing information  
Guess and test  
Multiple solutions  
Recognize answers as reasonable

Read, record time to the nearest minute  
Use a calendar to identify dates  
Measure in centimetres, decimetres, to the nearest unit  
Estimate and measure in centimetres, decimetres, metres  
Convert between decimetres and centimetres; centimetres and metres  
Express metres, decimetres, and centimetres with decimals  
Estimate and measure capacity in litres  
Estimate and measure mass in kilograms  
Introduction to kilometres, grams, and millilitres  
Measure and compare temperatures  
Find perimeter by measuring  
Count centimetre squares; give area in square centimetres  
Count centimetre cubes; give volume in cubic centimetres

Recognize similar shapes  
Recognize, draw, compare line segments  
Identify and name triangles, rectangles, squares, pentagons, hexagons, octagons  
Recognize cubes, prisms, pyramids, cones, cylinders, spheres  
Count faces, edges, vertices  
Create slide, flip, or turn images  
Create patterns using slides  
Identify and show lines of symmetry; create shapes having line symmetry

Gather and organize information in bar graphs  
Create and interpret pictographs  
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|                                      |         |
|--------------------------------------|---------|
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# Timing Schedule by Units

The following information will guide you in planning your schedule for working through *Starting Points in Mathematics 2* in one year. Depending on the abilities of the children in your class, you will find sufficient material in Book 2 for a minimum program, an average program, and an enriched program.

There are approximately 175 days in the school year. The number of pages in Book 2 is 250. The number of days required to complete a unit will depend on the level of the children in your class. If many of the pages in Units 1 and 2 are considered

review, these may be dealt with fairly quickly, making more days available for further practice and evaluation related to the topics of Units 3 to 12.

No suggestions have been made for maintenance lessons because the need for these can be determined only by you for the children in your particular class.

Teachers wishing to provide a minimum program may plan to omit pages of certain units and, depending on the children's progress, return to some of these later in the year. In planning any schedule, it should also be kept in mind that certain topics such as measurement and geometry require more time than others as they involve more activity with concrete objects and manipulative materials.

| Unit             | Number of Pages | Number of Days | My Schedule |
|------------------|-----------------|----------------|-------------|
| 1                | 24              | 12-16          |             |
| 2                | 22              | 13-17          |             |
| 3                | 20              | 13-17          |             |
| 4                | 18              | 11-15          |             |
| 5                | 20              | 13-18          |             |
| 6                | 24              | 16-20          |             |
| 7                | 20              | 12-16          |             |
| 8                | 22              | 14-18          |             |
| 9                | 24              | 14-18          |             |
| 10               | 22              | 12-16          |             |
| 11               | 18              | 12-16          |             |
| 12               | 12              | 6-10           |             |
| Year-end checkup | 4               | 2- 3           |             |
| Total            | 250             | 150-200        |             |

## Timing Schedule by Strands

If you are a teacher who prefers to use a strand organization of the 250 pages in Book 2, the following information will guide you in planning your schedule for working through *Starting Points in Mathematics 2* in one year. The sequence, of course, is flexible but it does take into consideration that a study of time to the half-hour and to the quarter-hour, for example, is probably best preceded by a study of fractions.

There are approximately 175 days in the school year. The number of days required to complete a strand will depend on the level of the children in your class. If many of the first 40 pages in *Starting Points in Mathematics 2* are considered review, these may be dealt with fairly quickly, making more days available for further practice and evaluation related to other topics.

Depending on the abilities of the children in your class, there is sufficient material in Book 2 for a minimum program, an average program, and an enriched program.

Note that each *Checkup* is not included in the outline. Exercises from these pages may be assigned where appropriate, or the pages may be used as review prior to the *Year-End Checkup*. No suggestions have been made for maintenance lessons because the need for these can be determined only by you for the children in your particular class.

Teachers wishing to provide a minimum program may plan to omit pages of certain units and, depending on the children's progress, return to some of these later in the year. In planning any schedule, it should also be kept in mind that certain topics such as measurement and geometry require more time than others as they involve more activity with concrete objects and manipulative materials.

| Strand  | Number of Pages | Number of Days | My Schedule |
|---|-----------------|----------------|-------------|
| Numeration, to 19                                     | 12              | 6-10           |             |
| Addition and subtraction,<br>sums and minuends to 10  | 23              | 14-17          |             |
| Mass  | 5               | 3- 4           |             |
| Capacity and volume                                   | 5               | 3- 4           |             |
| Practice in addition<br>and subtraction               | 6               | 3- 4           |             |
| Numeration, to 100                                    | 10              | 6- 8           |             |
| Money   | 8               | 4- 7           |             |
| Temperature   | 2               | 1- 2           |             |
| Addition and subtraction,<br>sums and minuends to 14  | 13              | 8-11           |             |
| Fractions   | 8               | 4- 6           |             |
| Addition and subtraction,<br>sums and minuends to 18  | 10              | 6- 8           |             |
| Time  | 6               | 3- 5           |             |
| Addition and subtraction,<br>sums and minuends to 99  | 17              | 10-13          |             |
| Graphing  | 6               | 4- 5           |             |
| Geometry  | 9               | 6- 7           |             |
| Addition, sums to 99                                  | 14              | 11-14          |             |
| Length  | 11              | 6- 8           |             |
| Subtraction, minuends to 99                           | 14              | 12-14          |             |
| Practice in addition<br>and subtraction, regrouping   | 9               | 5- 7           |             |
| Area  | 3               | 1- 2           |             |
| Numeration, to 999                                    | 10              | 6- 8           |             |
| Time  | 3               | 1- 2           |             |
| Multiplication and division                           | 10              | 6- 8           |             |
| Money   | 8               | 6- 7           |             |
| Geometry  | 4               | 2- 3           |             |
| Addition and subtraction,<br>sums and minuends to 999 | 8               | 5- 6           |             |
| Checkup   | 12              | 6- 7           |             |
| Year-end checkup                                      | 4               | 2- 3           |             |
| Total   | 250             | 150-200        |             |



# The Mathematics Centre

A mathematics centre, like centres for other subject areas, is a place for the storage of certain specific materials and an area for the children to become involved in activities. With careful planning and involvement of the children, the mathematics centre can become a stimulating environment. The children will enjoy bringing materials from home to supplement and add variety to those in the centre. The mathematics centre is an ideal place to display the children's work. If a thematic approach is used for teaching mathematics, the centre can be adapted as a setting for each new theme.

When the children have finished their regular assignments, they may engage in extra activities and projects in the mathematics centre. Activity cards, puzzles, games, and homemade as well as commercial materials will lead the children to broader understanding as well as provide opportunities for the teacher to observe and question the children, and to evaluate their progress. Consideration of the children's interaction in the mathematics centre will suggest adaptations to make this strategy an important part of the learning experience.

## STORAGE OF MATERIALS

Materials should be stored where children can have easy access to them. Open shelves and small tables can be used in a pleasing and practical arrangement for holding containers. Containers for materials should be both sturdy and colorful. Vinyl coverings, spray enamel, wallpaper, and fabric will increase the durability of the containers as well as the appeal of the mathematics centre. The following are some ideas for containers to add variety to the centre.

**Pails:** Cut the top off a large plastic bottle. Punch two holes in the remaining part and insert a wire handle. Decorate the pail with vinyl adhesive shapes.

**Trays:** Collect the corrugated boxes in which canned soft drinks are sold. Cover each box with pre-pasted wallpaper.

**Baskets:** Select a variety of cardboard or wooden baskets, with handles, in which fruit and vegetables are sold. Spray each basket with brightly colored paint.

**Boxes:** Collect sturdy boxes made of corrugated cardboard, such as those from small appliances. Openings may be cut at the top of opposite ends for easy carrying, but these "handles" should be reinforced with vinyl tape. Cover these boxes with fabric or wallpaper.

**Other Containers:** Ice cream containers, large cans, plastic tubs, and foil containers can also be decorated and used for storing materials.

## MATERIALS

The materials used for teaching mathematics need not be expensive commercial materials; simple everyday objects can be used effectively as learning and teaching aids.

A list of the materials suggested for each unit is given in the unit overview. When a unit is almost completed, look ahead to the next unit and begin to collect and have the children help to collect the materials.

The following materials will be helpful for developing the various concepts and skills.

## Pre-Number Concepts

Collections of objects from which to choose items

- for identifying likenesses and differences
- for sorting activities
- for one-to-one matching
- for making size comparisons
- for forming patterns

Suitable objects for these collections include

|                     |                   |
|---------------------|-------------------|
| balloons            | gummed shapes     |
| balls               | marbles           |
| beads               | nesting toys      |
| beans               | nuts              |
| blocks              | pasta pieces      |
| bottle caps         | pebbles           |
| buttons             | playing cards     |
| clothes pins        | shells            |
| crayons             | spools            |
| cutouts of pictures | tongue depressors |
| cutouts of shapes   | toothpicks        |
| geometric shapes    | toy cars          |

Suitable containers for sorting these objects into sets are

|                      |                 |
|----------------------|-----------------|
| egg cartons          | muffin tins     |
| plastic tubs         | plastic hoops   |
| paper or foil plates | Styrofoam trays |

## Number

- counters such as beads, beans, buttons, pebbles, spools, nuts, Unifix cubes
- objects for grouping, such as tongue depressors, popsicle sticks, pipe cleaners, drinking straws, stirrers, toothpicks, beans in plastic bags
- flash cards for the numerals 0 to 20 and the words *zero* to *twenty*
- flash cards for addition and subtraction facts
- index cards for making number concept cards
- number trays for the numbers from 1 to 10 (11 to 20 optional)
- dice or number spinners
- dominoes and domino cards
- shapes marked to show halves, thirds, fourths, and tenths of a whole

## Geometry

- a collection of three-dimensional shapes, such as balls, boxes, cans, tubes from rolls of paper, funnels
- commercial wooden or plastic solids (cubes, cones, spheres, cylinders, rectangular prisms, triangular prisms, triangular pyramids, square pyramids)
- commercial wooden or plastic plane shapes (circles, rectangles, squares, triangles, hexagons (optional))
- geoboards, colored rubber bands
- geopaper (See pages T341 and T342.)
- parquetry blocks and gummed shapes for forming patterns
- pictures of symmetrical objects and shapes
- felt, plastic, or cardboard tangram pieces (See page T347.)

## Measurement

- real money, play money, coin cutouts from page T327
- items and price tags for a play store
- non-standard units for measuring length (tongue depressors, drinking straws, cardboard strips, ribbons, paper clips, nails)
- metre sticks
- rulers or straightedges

- objects for comparing masses (stones, Plasticine balls, marbles, washers, nuts, beans, corks, small sponges, Styrofoam balls)
- balance scales
- non-standard units for measuring capacity (baby-food jars, paper cups, small cans)
- containers for comparing capacity (jars, bottles, cans, boxes)
- materials for filling containers (peas, beans, rice, shells, sand, water)
- demonstration clock, alarm clock, old mechanical clocks and wristwatches, clock faces (See pages T337 and T338.)
- sample calendars and blank calendars

It is desirable for each child to have a box of materials for her/his own use. These materials should be used during the discussion period of a lesson, but they may also be useful to the children when they are completing written work. Four basic materials are suggested below.

1. a set of counters
2. numeral cards for 0 to 20
3. a number line from 0 to 20
4. a paper-plate clock face (See page T100.)

Other materials may be included as desired, for example, a straightedge, number strips, and coin cutouts.

There are many other teaching aids that will be useful in a mathematics program, for example, Cuisenaire rods, D-Stix, Base Ten Blocks. They may be acquired over a number of years, but the following aids are basic for the activities in this book.

**Display Board:** The display board mentioned in the suggested activities for various lessons may be a flannel board, a magnetic board, a bulletin board, and so on. Felt-backed cutouts of objects, numerals, and symbols are useful for demonstrating new concepts and illustrating additive and subtractive situations.

**Display Panel:** This is a board on which each child is assigned a place where a sample of her/his work is always on display. The children should be allowed to help select the sheets from their own work for display, and in this way learn to compete not with others but with themselves. They develop feelings of confidence and self-respect, learn to become more analytic toward their work, and learn to give and accept criticism.

**Attribute Blocks:** These are sets of wooden or plastic blocks that show likenesses and differences in color, shape, size, and thickness. One set usually includes 48 pieces made up of four shapes (circle, rectangle, square, triangle), three colors (red, blue, yellow), two sizes, and two thicknesses.

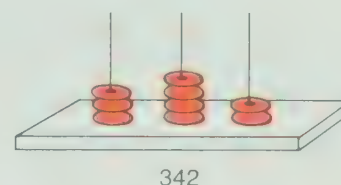
If commercial attribute blocks are not available, you may wish to make your own blocks by using the patterns given on pages T323 and T324. The blocks may be made from plywood of two thicknesses, one of which is about three times as thick as the other. Parents, teacher assistants, or older children in industrial arts courses may assist in making sets of blocks for children in your class.

**Numeral Cards:** It is suggested on page T7 that each child prepare a set of numeral cards for 0 to 9 for her/his own use. On later pages it is suggested that the set of cards be extended to 20. These cards can be used not only for games and activities involving numbers but also for responses to questions. Later, cards showing multiples of ten and the numerals to 99 will be required. A convenient device for showing two-place numerals is a flip chart as described on page T107.

**Number Line:** A walk-on number strip made from tiles or plastic is suggested for initial experiences before introducing the number line. A number line on the chalkboard or display board may be permanently displayed where children can see it from their desks. You may wish to provide each child with a number line.

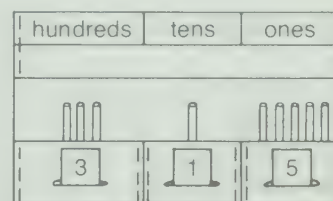
**Peg Abacus:** A simple peg abacus can be made from a Styrofoam tray, three wires of equal length cut from coat hangers, and plaster of Paris. Fill the tray with a mixture of plaster of Paris. Before it sets, insert the three wires and then allow the plaster to set. Use objects (colored wooden beads, washers, or empty spools) for representing numbers. The wires should be about 5 cm long unless empty spools are to be used, in which case they should be about 30 cm long.

A sturdier peg abacus may be made using wooden dowels on a wooden base. It is important that children view the abacus from the same side and not from opposite sides, which would result in a reversal of the place values.



**Pocket Chart:** A pocket chart for demonstrating place value and regrouping may be made in a variety of ways. One of the simplest forms is illustrated below.

Bristol board or thick plastic is cut in one piece, folded, and stitched or stapled where indicated to make three pockets for working with hundreds, tens, and ones. Slits may be made in the pockets to accommodate numeral cards for showing the standard numeral for the number of hundreds, tens, and ones.



**Elevator Beads:** This is a convenient device for children to use for counting and for illustrating basic number facts, because the beads can be moved along the string to stay in certain positions.



Select 10 beads of one color and 10 of another color. Cut a piece of string more than twice the length of the 20 beads, being certain to provide plenty of slack. Fold the string in half and at the folded end tie a knot for a finger loop. Thread the two ends of the string through each bead with each of the two strands going through the hole from opposite sides. Continue to place the beads on the string, alternating the colors, until the 20 beads have been used. Leave some slack at the end and tie two knots for a finger loop.

**Number Board:** A board with 121 removable tags is described on page T322.



# Unit 1 Overview

This unit is primarily a review of some of the topics in *Starting Points in Mathematics 1*. Number concepts from 0 to 9 are reintroduced and numbers are compared using the terms *greater than* and *less than*. The symbols to represent these relationships— $>$  (is greater than) and  $<$  (is less than)—are presented for the first time in this unit. Ordering the numbers from 0 to 10 reinforces the number concepts and leads to the ordinal number concepts *first to tenth*. The joining of two groups is related to number sentences showing addition for sums to 9. Practice exercises are provided and interesting illustrations and number lines are used to help children acquire greater understanding of addition. Measurement topics include comparison of two masses using the terms *lighter*, *heavier*, and *the same as*, linear measurement with a simple non-standard unit, and amounts of money to 9 cents represented by pennies and nickels. Likenesses and differences in shapes and patterns provide an easy introduction to the geometric concepts in this book. The last lesson in the unit is a *Checkup* of the number concepts, addition facts for sums to 9, and amounts of money.

## Unit Outcomes

### Number

- recognize sets of zero to nine
- recognize and print the numerals 0 to 9
- identify and record the number of a set having from zero to nine members
- order the numbers from 0 to 10
- identify numbers greater than or less than a given number, to 10
- recognize and use the symbols  $>$  and  $<$  for *is greater than* and *is less than*
- demonstrate an understanding of the ordinal number concepts to *tenth*
- recognize the ordinal number names *first to tenth*
- write number sentences to show addition, sums to 9
- complete addition sentences for sums to 9
- use the number line for addition, sums to 9
- recognize that the order of the addends does not affect the sum
- use the vertical form for addition
- complete basic addition facts, sums to 9

### Measurement

- describe one mass as *heavier than*, *lighter than*, or of the *same mass* as another
- use pennies and nickels for amounts to 9 cents
- measure length using non-standard units
- estimate length using non-standard units; measure to check an estimate of length

### Geometry

- make and interpret a horizontal bar graph
- recognize likenesses and differences in objects, shapes, and patterns

## Background

**Number:** There are two aspects for any number, the cardinal concept and the ordinal concept. The number five can represent

any group, or set, of five objects; or the number five can represent the fifth place in a sequence.

The cardinal concept of number is based on an understanding of how many there are in a set, or the “manyness” of that set. The ordinal concept of number is based on identifying the position of a single member of the set when the members of the set are placed in sequence.

A cardinal understanding of number is developed by one-to-one matching, classifying objects with common cardinal number characteristics (the common characteristic of a table and a horse is the four legs of each), and by counting.

Ordinal concepts are based primarily on counting experiences that are related to a particular sequence. After rote counting, the early experiences with one-to-one matching, classification, and sequences, children acquire an ability to count on a different level by matching number names in a fixed sequence with members of a set.

Whereas the cardinal aspect of a number indicates how many members there are in a set, the ordinal aspect refers to which one of a set. Both are determined by counting, but there is a basic difference. A cardinal number can be found by starting with any member and counting (one, two, three, . . . ) every member. An ordinal number is found by starting with one particular member and counting (first, second, third, . . . ) in a certain pattern or direction.

The use of graphs to convey information is becoming more common in everyday life. In this unit the children complete a simple bar graph using a scale of one to one. The picture obtained becomes a visual aid for interpreting and comparing the results. An advantage of the bar graph is thereby realized; that is, the length of each bar bears a direct relationship to the size of each quantity, a feature not shown by numbers alone.

Addition is reviewed as corresponding to the joining of sets, and the symbols  $+$  (plus) and  $=$  (equals) are reviewed in connection with number sentences. The significance of the symbol  $=$  should be kept in mind; namely, the expressions joined by it represent the same number. For example,  $7 + 2$ ,  $4 + 5$ ,  $1 + 8$ , and  $10 - 1$  represent the number nine, but the simplest expression is the numeral 9.

The symbols  $>$  and  $<$  for *is greater than* and *is less than* are introduced so that the children can write number sentences using expressions that are not equal. As it is known that symbols confuse some children and even adults, much patience and care will be required when introducing the symbols. If children seem more secure writing the words, do not insist on the use of the symbols. Keep in mind that the symbols refer to numbers, not to concrete objects. The words *bigger* and *smaller* refer to the latter and *greater* and *less* refer to numbers. Encourage the children to use the four words correctly.

Most children will know that the sum of two numbers is the same regardless of their order (commutative property). The children will realize the significance of this property as they work with the basic addition facts. Because of the commutative property, the number of basic facts having unlike addends can be halved, for example, if  $6 + 2 = 8$ , then  $2 + 6 = 8$ . By stressing addition facts in pairs, wherever possible, both facts are learned and one fact helps in knowing its partner.

The vertical form for showing addition is reviewed as an alternative way to writing number sentences. It is important that the children learn to use the vertical form, in preparation for the work in later units involving addition of two-digit and three-digit numbers.

**Measurement:** Mass refers to the quantity of matter in an object and is measured by placing the object on one side of balance scales and standard units of mass on the other. The concepts *heavier than*, *lighter than*, and *the same as* are reviewed as children compare masses using the balance scales. Weight is probably a more familiar term than mass, but the two are not the same. Weight is the measure of force required to lift or support an object and is measured by a spring balance. Thus, weight can vary since it is influenced by gravity. Mass cannot vary since the force of gravity is the same on both sides of the balance scales.

Measuring length in non-standard units involves selecting an appropriate unit and counting how many times the unit is contained in the length. This requires careful placement of the units end to end and accurate counting and recording. After children have become familiar with a unit of measurement, they may begin to estimate lengths in that unit before measuring. Encourage them to give serious consideration to estimates and provide them with many opportunities to estimate.

**Geometry:** Logical reasoning is introduced as children are asked to recognize likenesses and differences in shapes. For such activities, attribute blocks are particularly well suited. (See page xxxi.) By playing with the blocks on their own and under a teacher's guidance, children improve their abilities to carry out processes of logical reasoning. For most sets, four attributes must be named to identify any one block (color, shape, size, and thickness).

## Teaching Strategies

Unit 1 reviews some of the concepts and skills that children probably met in their first-year mathematics programs. However, since learning is an individual process, the acquisition and mastery of concepts and skills could show a considerable range of achievement. You may wish to conduct a survey of the children's previous mathematical learning by involving them in oral and written work and the manipulation of materials. From the results you should be able to find the range of abilities in the class and to determine whether instructional groups should be formed—large groups if the range is relatively narrow, and small groups if the range is broad.

The selection of groups will also depend on the nature of the activities and the availability of materials. Small groups are recommended for topics that require discussion.

Some of the items listed under *Materials* are suggested for the teacher's presentation of lessons and others are intended for use by each child. It is recommended that each child be provided with an envelope in which he/she can keep sets of materials. In this unit the children should have 10 counters (tickets, plastic chips), numeral cards for 0 to 10, word cards for *zero* to *nine*, and two cards showing the symbols  $>$  and  $<$ . Coin cutouts from copies of page T327 and number strips and number lines, as suggested for the lessons on pages 16 to 19, are also suggested for children's kits of materials. As the children proceed through the other units of Book 2, the contents of their envelopes will change according to the topics being studied.

A play store is recommended for work with amounts of money. Children may be encouraged to bring items from home to place "on sale". By having a variety of items available, the store can be changed from time to time to become a grocery store, a toy store, a dairy store, or a bake shop. Suitable prices

may be placed on the items, according to the stage of the children's knowledge of money and ability to use the various operations.

Throughout this unit and in subsequent units, instructions are given in the textbook to indicate what is to be done on each page. It is not expected that children will be able to read these instructions themselves. It is recommended, however, that to begin the work of each page, you draw attention to the words, read them to the children, discuss them, and elicit from the children what it is they are required to do. In this way, children become accustomed to beginning each page by reading and interpreting the instructions given.

## Materials

various objects for showing sets with one to ten members  
display board and cutouts  
pictures of sets having from zero to ten members  
blank cards for each child to make numeral cards for 0 to 10  
flash cards for the number words *zero* to *nine*  
large sheet of graph paper, boxes of crayons  
numeral cards for 0 to 10 for display  
flash cards for the words *after*, *before*, *between*  
balance scales, various objects for comparison of masses  
flash cards for the words *heavier*, *lighter*, *same*  
ten counters and crayons for each child  
demonstration number line  
number line with matching number strips for 1 to 9  
a number line for each child  
flash cards for *is greater than* and *is less than*  
flash cards for showing the symbols  $>$  and  $<$   
the symbols  $>$  and  $<$  for the display board  
hand puppet  
two hinged paper strips for demonstrating  $>$  and  $<$   
flash cards for the names of the ordinal numbers from *first* to *tenth*  
chart showing cardinal and ordinal number words and numerals for 1 to 10  
attribute blocks or suitable substitute  
overhead projector  
cards showing addition phrases for sums to 9  
play store or store chart with objects having tags showing prices from 1¢ to 9¢  
real money, play money, or coin cutouts from copies of page T327  
paper clips and other objects for non-standard units of length  
flash cards for addition in horizontal and vertical form

## Vocabulary

number names *zero* to *ten*  
ordinal number words *first* to *tenth*  
names of the days of the week  
counterclockwise  
graph  
*after*, *before*, *between*  
order, number line  
*heavier*, *lighter*  
same mass  
*greater than*, *less than*  
*thick*, *thin*  
circle, rectangle  
square, triangle

join  
number sentence  
addition sentence  
plus, equals  
sum, add  
vertical form  
coin, value  
penny, nickel  
cent, price  
measure, estimate  
finger, hand  
span, pace  
measurement



## Unit 1 Theme – Arts and Crafts

The purpose of this theme is to acquaint the children with a variety of arts and crafts that may be pursued in leisure time. It is hoped that the children will share in the creative hobbies of their families as well as become aware of new possibilities for using their varied artistic talents. By gaining new skills, each child may enjoy the personal rewards of creating useful or decorative items.

Set up a display of samples of craft items illustrating such techniques as knitting, crocheting, quilting, weaving, and tapestry stitching. Also include samples of paintings, pottery, sculpture, and handmade jewellery. When the children have completed items, include these in the display. Arrange a collection of books on art and craft projects. These will provide both instruction and inspiration. Supply such materials as

|                  |                 |         |
|------------------|-----------------|---------|
| fabric scraps    | pipe cleaners   | beads   |
| yarn scraps      | assorted papers | clay    |
| seeds and grains | cardboard tubes | wire    |
| aluminum foil    | spools          | buttons |

Many of the above items are household discards that can be brought from home by the children. Either fruit baskets with handles or shoe boxes are suitable storage containers.

### LANGUAGE ACTIVITIES

Plan to begin the time assigned to a theme with a brief discussion. It is also beneficial to read appropriate material at this time to provide input on the topic. Finish each theme period with sharing time so that the children can display and discuss their work.

#### 1. All Kinds of Hobbies

Introduce the word *hobby* and have the children explain what the word means to them. Through discussion, explore the idea that hobbies provide enjoyment and relaxation.

Make a list on chart paper of the hobbies enjoyed by children in the class. Have them group the hobbies under such headings as “Arts and Crafts”, “Sports and Games”, and “Collections”.

Make another list of the hobbies that were identified as arts and crafts. Save the original information sheets for future themes. Have the children suggest other art and craft activities they know. Include others in this list as the children gain experience and knowledge.

Create activities based on the words in the list. For example, some activities may involve unscrambling letters, arranging the words in alphabetical order, arranging the words from longest to shortest, and showing the syllabication of the words.

#### 2. Visiting a Display of Arts and Crafts

Plan to visit an exhibition of arts and crafts or an artisan at work. Local craft guilds or community colleges have displays that often include one or more demonstrations. Many artisans, such as potters and weavers, welcome visitors and enjoy demonstrating their skills.

Before the visit, discuss with the children what they expect to see and also what they want to find out. They may be interested in materials, techniques, training or instruction. List their ideas on a chart and refer to the chart after the trip to verify and reinforce what was learned.

Have each child illustrate the part of the visit that he/she enjoyed the most and write a brief account to accompany the illustration. Use these to make a class book for the display.

### 3. Inviting a Guest Speaker

Members of the community may welcome the opportunity to bring their materials to the school and give a demonstration to a class. This is also an opportunity for the children to practise the social skills of extending an invitation and introducing and thanking a guest speaker.

Before the guest arrives, list the things that the children want to know about the particular craft. You may also wish to record specific questions to be directed to the guest. After the visit, refer to the chart to reinforce what was learned.

If possible, have the children attempt the craft that was demonstrated. If you have been visited by a weaver, let the children try weaving with paper strips. After they have had an opportunity to experience the craft, encourage them to write thank-you notes sharing their experiences.

## MATHEMATICS ACTIVITIES

### 1. Graphing

Refer to the bar graph on page 4 of Unit 1. Discuss with the children how to make a bar graph to show which arts and crafts are enjoyed by the children in the class. Make the graph with the children.

### 2. Patterned Jewellery

Macaroni colored with tempera paint or food coloring is ideal for this activity. Cut pieces of string for making bracelets or necklaces. Moisten the two ends of each piece of string with white glue and allow it to harden to make threading easier.










Have each child plan a simple pattern based on color and then make a bracelet or a necklace having that pattern. Encourage the children to identify their patterns by using ordinal numbers; for example, the fourth bead is green, the ninth bead is blue.

### 3. Geometric Patterns

Interesting and colorful patterns and border designs can be made by using stamps made from potatoes. Wash a potato and cut it in half. Use a pencil to mark one of the four basic shapes (circle, rectangle, square, triangle) on one cut end of the potato. Use a sharp knife to cut around the shape so that it will be raised about one centimetre above the outer edge of the potato. Allow the potato to dry so that there will be no potato juice on the surface.

Press the surface of the potato stamp on a colored ink pad or coat the surface with tempera paint. Press the potato stamp lightly but firmly on a sheet of newsprint. Lift the potato stamp carefully so that the ink or paint does not smudge the print. By pressing the potato stamp in successive positions around the edges of the paper, a border design can be printed along the four sides.

Prepare several of these potato stamps in different sizes of the various shapes for the children to use to make specified designs or designs of their own choosing. Slides and turns can be introduced informally at this time. Activity cards can be prepared to instruct the children to make patterns based on repetitions of shapes and colors, similar to the following:

1. 1 red  , 1 blue  , 1 yellow 
2. 2 blue  's, 2 yellow  's, 1 red 
3. 2 red  's, 1 blue  , 3 green  's

#### 4. Quilt Patterns

Quilting has regained popularity as a rewarding and creative craft. Originally, it was necessary to use every scrap of available fabric to make quilts or bed covers for warmth in winter. Pioneer women created intricate and colorful patterns that are still popular today. Show some traditional quilt patterns to the children. The book *Once upon a Quilt: Patchwork Design and Technique* by Celine Blanchard Mahler, published by Van Nostrand Reinhold Company in 1973, is an excellent reference for these patterns. Have the children discover that some combination of the basic geometric shapes makes up each pattern. Have the children use paper shapes to duplicate some of the traditional quilt-pattern blocks. They may wish to cut and paste fabric shapes to create patterns of their own. Note that this is an excellent introduction to the activities involving symmetry in Unit 3.

### SCIENCE ACTIVITIES

#### 1. Classifying Materials

Have the children examine the materials in the arts and crafts display. Ask them to suggest ways in which the materials can be sorted. Divide the class into groups and have each group sort in a different way. Have each group record the information. Some ways for sorting are as follows:

- natural materials/man-made materials
- things that can be cut/things that cannot be cut
- things that are hard/things that are soft

#### 2. Objects from Nature

Many natural materials are ideal for art and craft activities. Have the children help to collect such things as

|        |           |                  |
|--------|-----------|------------------|
| nuts   | feathers  | grains and seeds |
| leaves | driftwood | dried grasses    |
| cones  | bark      | small pebbles    |
| shells | sand      | sticks and twigs |

Discuss the origin, the characteristics, and the uses of each item. Have the children suggest some art or craft activities for which these materials might be used.

### SOCIAL STUDIES ACTIVITIES

Most modern-day arts and crafts have their origins in a variety of cultures or geographical regions. Many were not considered crafts; they were often items necessary for sustaining the comforts of life, such as containers for preserving food or coverings for the body. Some arts and crafts are traditional, however, and can be traced over many centuries, for example, decoupage and origami. The children may gain an appreciation of other cultures by experimenting with several of these traditional crafts.

#### 1. Crafts of Other Cultures

##### *Early Days*

Long ago, clay was used to fashion pots and containers for food and water. Pottery techniques have been refined over the years so that it is now possible to produce fine tableware. Many artists use their hands or a potter's wheel to fashion raw clay into dishes, plant holders, and ornaments.

If possible, show the children samples of a potter's work. Allow them to feel soft, damp clay. They may make pots in either of two ways.

- a. Roll a lump of clay into a smooth ball. Press down gently on the ball to form a base. Insert the thumbs into the centre of the ball of clay and carefully pinch the clay between the thumbs and the forefingers until a pot is formed.
- b. Roll out a lump of clay with a rolling pin. Use a metal can as a cookie cutter and cut out a base. Roll lumps of clay to the thickness of a pencil. Coil these around the base, building upon each previous coil. Moisten the coils with a little water to make them stick together.

The pots will have a longer life and will also hold liquids if they are baked in a kiln. If this is not possible, they may be dried in the air and colored with tempera paint.

##### *Japan*

Origami or Japanese paper folding is a delicate and unique art. The paper is folded in various and intricate ways to produce birds and animals. Step-by-step illustrations of these are shown in many books. You may wish to begin with a simple creation such as the boat or the hat. Origami paper is available, but tissue paper is equally suitable for folding.

##### *China*

The Chinese have made kites for many centuries. These kites are often seen on holidays or at celebrations. Some of the kites are so large that several people are required to fly them. Many have either boxlike or cylindrical shapes painted to represent dragons.

A simple kite for young children to make is the diamond kite. A frame is made in the shape of a cross (+) from narrow strips of pine. This frame can be covered with kraft paper or plastic film. A tail made from strips of felt or other fabric will help to balance the kite when it flies.

##### *France*

Decoupage is also a very old art. A picture is glued on a background, a box, or other container and covered with many coats of lacquer until the surface is completely smooth.

Decoupage can be achieved simply in the classroom by mounting a picture on a piece of scrap pine. Dilute white glue with water and give the picture about six coats of this mixture, allowing the glue to dry between coats.

### ART ACTIVITIES

#### 1. Stone Creatures

Select stones that tend to be oval in shape but have at least one flat side. Have the children use tempera paint and bits of fabric, fur, or feathers to create whimsical creatures.

#### 2. Sand Pictures

Use small amounts of food coloring or tempera paint to color batches of sand. Have the children mark a sheet of paper or thin cardboard into four or five sections to make a pattern. Lightly coat one section with glue and sprinkle with sand of one color. Shake off the excess sand. Continue until all the sections are covered with sand. Have the children experiment with various patterns and color combinations.

#### 3. Stick Painting

Remove any loose bark from twigs or sticks. Have the children create various lines and effects using the twigs and tempera paints.



#### 4. Personal Bookmarks

Provide the children with pieces of felt of different colors measuring about 16 cm by 5 cm. Have the children use materials from the arts and crafts display to create a personal bookmark for their reader or favorite storybook.

#### 5. Popsicle Stick Gifts

Provide a supply of popsicle sticks and white glue and let the children create a popsicle stick gift for a friend or for a member of the family. The following are some suggestions.

##### *Place Mats*

Cut a piece of cardboard to a suitable size for a place mat. The length and the width of the cardboard should accommodate an even number of popsicle sticks so that there will not be a cardboard border around the place mat. Laminate the bottom surface of the cardboard. Different colors of tempera paint can be used to make a colorful pattern or design on the popsicle sticks. After the paint has dried, the place mat can be given one or two coats of clear shellac.

##### *Desk Set*

Obtain a clean soup can for a pencil holder and a shallow can, such as a tuna can, for a paper-clip holder. Cut popsicle sticks to the lengths required for gluing vertically around the two cans. The holders will look more attractive if the ends of the popsicle sticks project about 1 cm above the top of a can. After the glue has dried, the popsicle sticks can be colored with tempera paint, which in turn can be coated with clear shellac.

### MOVEMENT ACTIVITIES

#### 1. Free Movement

Have the children examine the pictures made by stick painting. Ask what kinds of movement are suggested in the pictures. Have the children move in the ways suggested in the pictures.

### MUSIC ACTIVITIES

#### 1. Musical Instruments

Many household discards are suitable for making musical instruments for the classroom. Suggestions are given for making at least one for each of the four groups of instruments: brass, percussion, string, and woodwind. Discuss with the children these four groups of instruments and how sound is produced from them by blowing, striking, plucking, and bowing. Mention that the first horn was probably a horn from an animal; the first drum was probably the skin of an animal stretched over the end of a hollow log; the first stringed instrument was probably a hunter's bow; and the first wind instrument was made from a hollow reed.

The following are some ideas for making simple instruments so that you can have your own classroom "orchestra".

##### *Drums*

Obtain one or more large plastic tubs such as those used for ice cream. Punch a hole in each side of a tub. Push one end of a colored cord or ribbon through each hole and knot it on the inside of the tub. The cord or ribbon should be of a convenient length so that the drum can be hung around a child's neck for easy drumming.

Place the cover on the tub and seal it with a strip of wide colored tape. The sides of the drum can be decorated with gummed shapes and stars, pictures and designs from prepasted

wallpaper, pieces of colored plastic tape, rick-rack braid, and other colorful trims.

Display the drum and help the children who are interested in having a drum to make and decorate their own.

Drum sticks can be made from dowels. The handles of wooden spoons will work just as well.

##### *Horns*

Horns of various sizes can be made from the plastic containers from vinegar or bleach—the containers with the handles.

With a sharp knife cut off the top of the container below the screw cap and also the bottom of the container. Wrap colored plastic tape over the cut edges to protect the lips and fingers from the sharp edges.

Decorate each horn in the way suggested for the drums.

##### *Guitars*

Obtain a deep covered box such as a shoe box. In the centre of the cover draw a large circle. Use a sharp knife to cut away the circular part. A ruler can become a handle for the guitar. Cut a slit through one end of the cover, insert one end of the ruler and glue it in place. Place the cover on the box and use colored plastic tape to hold it securely.

Stretch four rubber bands of different lengths and widths lengthwise over the box and across the opening. The different lengths and widths suggested for the rubber bands will make different sounds. Pluck the bands to test for the best selection of rubber bands. Before the rubber bands are placed in position, the "guitar box" may be decorated.

##### *Musical Bottles*

Obtain eight soft-drink bottles and place them in a row. Tap the first bottle with a spoon to test for sound. Pour a small amount of water into the second bottle and again test for sound. Repeat the procedure until you have eight different levels of water to obtain the eight musical notes. When the water level in each bottle is satisfactory, mark that level with a band of tape so that the level can be maintained as the water evaporates.

To play the musical bottles, strike each one with a spoon to make a different note.

By blowing across the mouth of each bottle, the bottle can become a flute.

Instead of using bottles of the same size, an assortment of bottles of different sizes and shapes make a more interesting "instrument".

##### *Kazoos*

Collect cardboard tubes of various sizes. The different sizes will produce different sounds.

Wrap a piece of wax paper smoothly and tightly around one open end of a tube. Place a rubber band about 2 cm below the end of the tube to hold the wax paper securely in place. Using a sharp pencil, make a hole about 1 cm above the rubber band. Push the pencil through until the tip almost reaches the opposite side of the tube and then remove the pencil. Hold the open end of the kazoo to your mouth and blow and hum a favorite tune. The result will be a vibrating sound.

##### *Bells*

Obtain empty cans of various sizes from the small ones used for baby food to the large juice cans. Use string or wire to fasten a washer or a nut to a screw eye to serve as a clapper. Punch a hole in the bottom of a can and insert the screw eye through the hole so that the eye and the attached clapper are inside the can. Twist the screw into about 10 cm of dowel for a handle.



## Page 1

### OBJECTIVE

Recognize sets of zero to nine

### Materials

various objects arranged around the classroom in sets of one to nine

### Vocabulary

the number names *zero to nine*

### RELATED ACTIVITIES

- Prepare a large chart and display it so that the children will be able to print on it. Print a few suggestions on the chart. Leave several lines to include suggestions from the children. Be certain to include examples of the empty set in the classroom. Write the names of the objects and have children, in turn, record the number of each object. If a child suggests a set of more than nine objects, accept it and, if necessary, help the child print the numeral on the chart.

| In our classroom there are |                    |
|----------------------------|--------------------|
| 5                          | chalkboard brushes |
|                            | windows            |
|                            | doors              |
|                            | plants             |

- Have each child prepare a set having not more than nine members, by pasting or taping small objects on a sheet of colored paper. Through this activity the relationship between number and set is reinforced, while you acquire samples of sets for display and for use in the lessons that follow.

## LESSON ACTIVITY

### Before Using the Page

- Begin a discussion about things that the children can see in the classroom, for example, one teacher's desk, two doors, three windows, and so on. You may wish to arrange in advance some sets of objects to illustrate each of the numbers from zero to nine.
- Name an object in the classroom and have a child count how many there are. If a child counts incorrectly, ask another child if he/she agrees with the given answer. In this way the children are encouraged to listen to all responses and they learn to make and to receive constructive criticism. Ask the first child to count again, so that he/she will have an opportunity to give the correct answer.

After many different sets have been counted, say, "I know of a set that has not been counted. Count the snowballs on my desk." This request will establish the empty set. Ask the children to tell you what number we use to state how many snowballs there are. Accept only the reply "Zero", not "Oh"

or "Nothing". Ask several children to invent other sets of zero objects in the classroom.

Throughout this book the word "set" is used in its familiar, everyday sense. The words "collection" and "group" are equally suitable and may be used interchangeably with "set".

### Using the Page

- Discuss the activities that are taking place in the picture. Have the children identify objects that are grouped in the picture and count how many there are of each. Ask children to invent sets of zero objects for the classroom shown in the picture.



## LESSON OUTCOME

Print the numerals 0 to 9

### Materials

display board and cutouts, pictures of sets having from zero to nine members, a sheet of paper for each child

### Vocabulary

counterclockwise

## RELATED ACTIVITIES

• For children who are having difficulty printing certain numerals, choose one or more from the following remedial activities.

1. Use a finger to form the numeral in the sand tray.
2. Make the numeral out of Plasticine.
3. Cut numerals from sandpaper or felt. Glue them on a card. Have the children close their eyes and trace the numerals with their fingers again and again. Then they can trace the numerals with their fingers on their desks. Lastly, they can use a pencil to print the numerals on paper.
4. Make a work sheet on cardboard and show large numerals from 0 to 9 with arrows as directional clues. Cover the sheet with a piece of acetate. Have the children use a felt-tip marker or a china-marking pencil to trace over the numerals on the acetate. After the work is checked, the marks can be removed easily.

Print the numerals.



0

0

0

0

0



1

1

1

1

1



2

2

2

2

2



3

3

3

3

3



4

4

4

4

4



5

5

5

5

5



6

6

6

6

6



7

7

7

7

7



8

8

8

8

8



9

9

9

9

9

2 (two)

Printing the numerals 0 to 9

## LESSON ACTIVITY

### Before Using the Page

• Use the following procedure to build the sequence of numbers to nine. Start with zero cutouts on the display board.

1. Ask the children how many cutouts there are on the display board.
2. Print the corresponding numeral on the chalkboard.
3. Have the children form the corresponding numeral in the air.
4. Have several children print the numeral on the chalkboard.
5. Place one more cutout on the display board and repeat from step 1.

When forming the numeral 0, most children move their fingers in a counterclockwise direction. Discuss the meaning of the word *counterclockwise*. Have the children move their arms clockwise and then counterclockwise. The numeral 6 is also formed by a counterclockwise movement. For the numerals 2, 3, 5, and 7, check that these are facing in the proper direction, because children with perceptual difficulties tend to reverse these numerals.

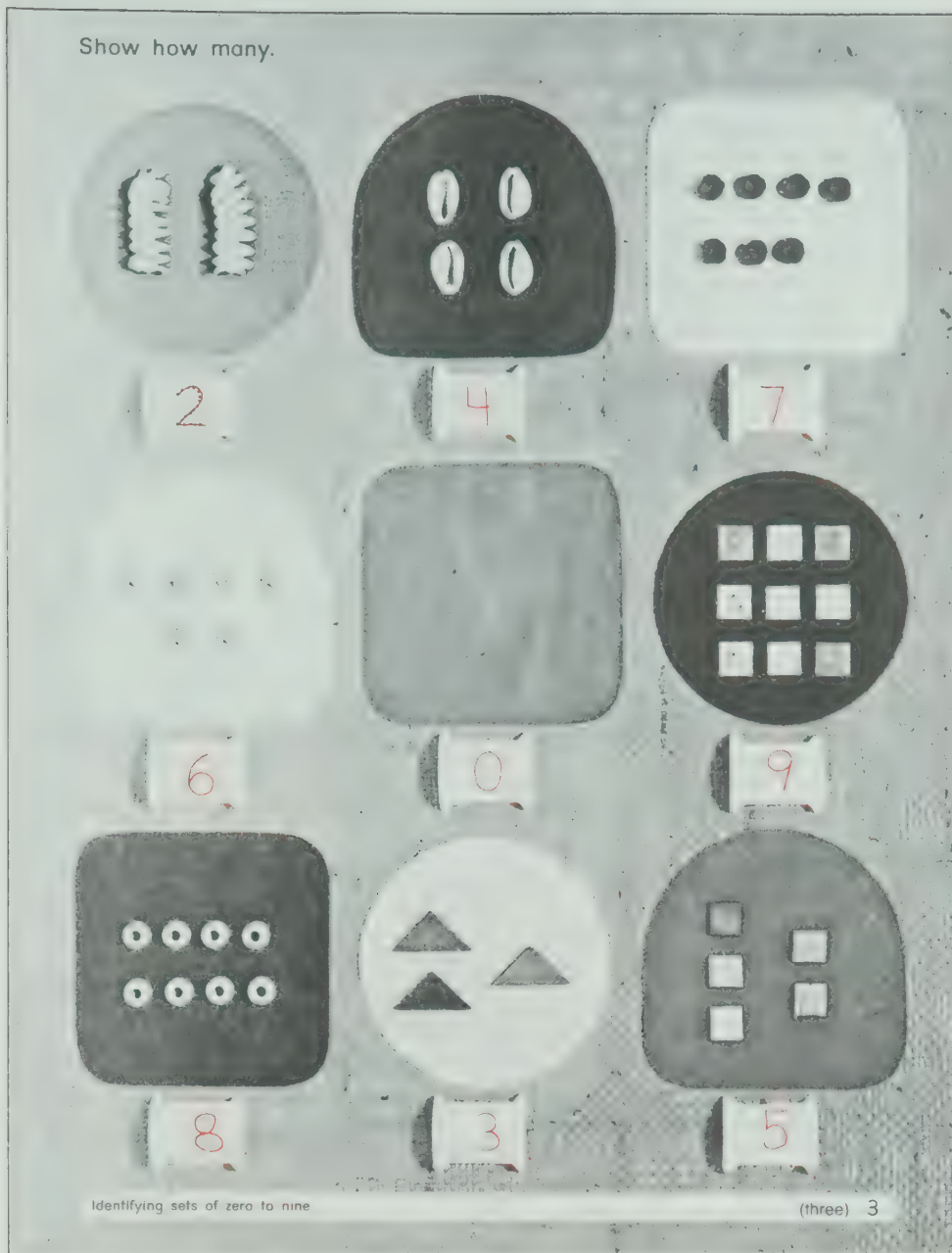
• Have several children print the numeral 0 on the chalkboard. Continue by having small groups of children, in turn, print other numerals.

• Use the sets of objects suggested in *Related Activities* on page T5. (You may prefer to use flash cards.) Hold up a set having from zero to nine members. Have the children print the corresponding numeral on a sheet of paper. Repeat for other sets.

### Using the Page

• Read the instruction to the children. Have them print the numerals as indicated. The arrows give directional clues for printing the numerals. After the children have completed the page, you may wish to have them count to find out how many purple beads there are, how many yellow beads there are, and how many green beads there are.

Show how many.



## LESSON OUTCOME

Identify and record the number of a set having from zero to nine members

### Materials

ten blank cards and a crayon for each child, display board and cutouts, flash cards for the number words *zero* to *nine*, small objects for making sets

## RELATED ACTIVITIES

- If the children prepared the sets of objects suggested in *Related Activities* on page T5, distribute some of these. Have the children count the objects in each set. Ask them to print the numeral and also the number word for each set.
- Prepare a work sheet similar to the one shown. Have the children draw the required number of simple objects and print the number word below each set.

|       |   |   |
|-------|---|---|
| 3     | 8 | 7 |
| ●●●   |   |   |
| Three |   |   |
| 6     | 5 | 9 |
|       |   |   |
|       |   |   |
|       |   |   |

A large sheet similar to the one shown may be prepared for displaying the numerals 0 to 9 in their proper sequence.

- Have children play a game in groups of two to four, using dominoes having dot patterns and numerals for the numbers to nine. Rules for playing the game are given on page T29.

## LESSON ACTIVITY

### Before Using the Page

- Have each child prepare a set of numeral cards for 0 to 9. One side of each card shows the numeral. The other side shows the number word. These cards will be useful for activities where several children may respond at the same time.

Place several cutouts on the display board. Have the children hold up their numeral card for the number of cutouts in the set. Repeat with other sets.

- Ask a child to hold up one of the numeral cards. Ask another child to place that number of cutouts on the display board. Repeat several times.

- Display the word for a number from zero to nine. Have the children read it. Repeat for the other number words to *nine* in any order.

- Display a set of zero to nine objects. Have the children hold up the card showing the word for the number of objects. Repeat for other sets.

### Using the Page

- Ask a child to read the words at the top of the page. Ask another child to explain what is to be done for this page. Have the children print the numeral on the spool below each set. After the children have completed the page, ask them to find out which number from zero to nine does not have a set shown on the page.



LESSON OUTCOME

Use information to complete a horizontal bar graph; interpret the information shown in a graph

Materials

a large sheet of graph paper, a box containing the following crayons – 6 red, 7 blue, 3 green, 4 yellow, 1 brown, 4 purple, crayons for each child

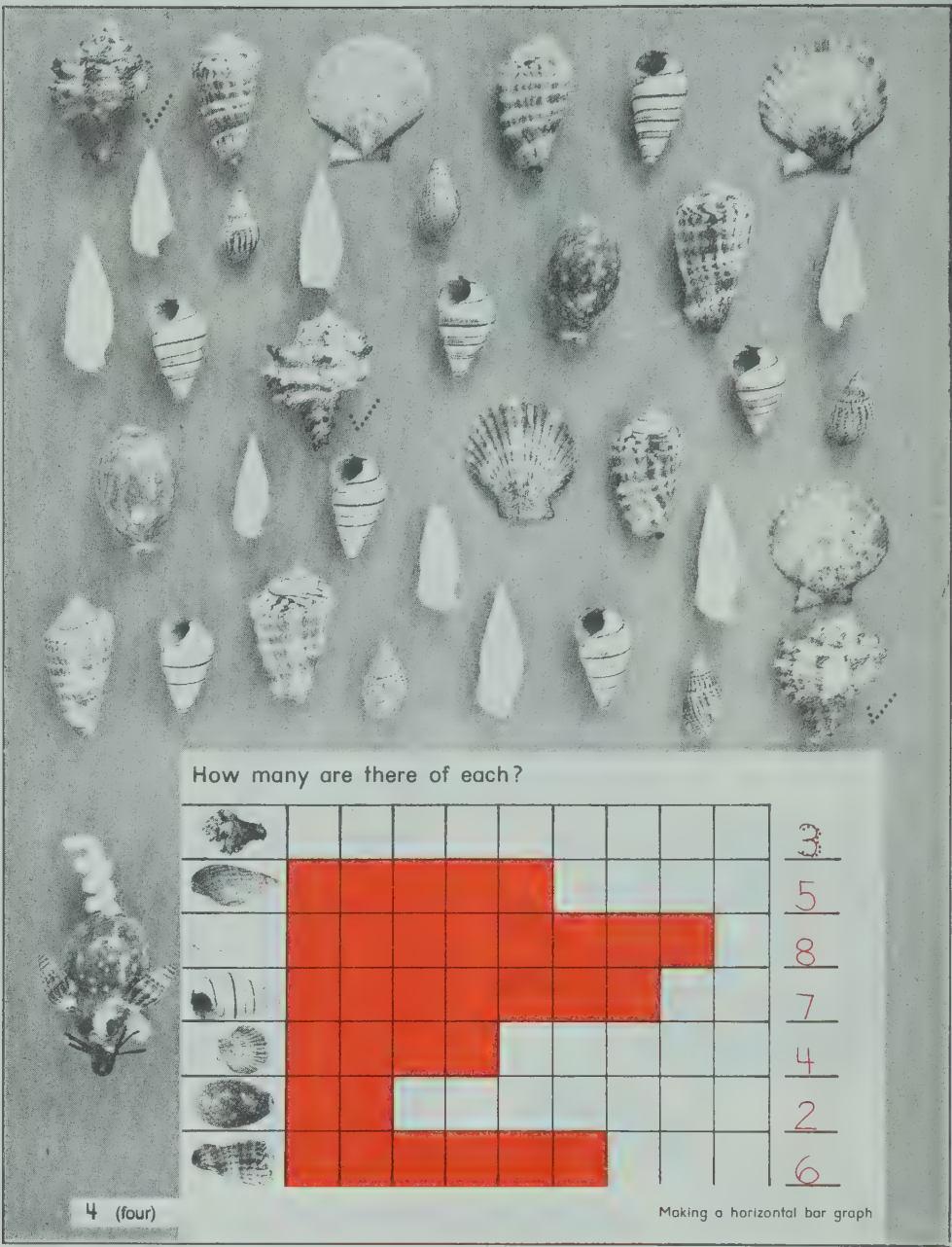
Vocabulary

graph

RELATED ACTIVITIES

• Children enjoy preparing and discussing graphs for topics that relate to themselves. You may wish to divide the class into groups to prepare graphs for different topics. Have each group present its graph and ask questions for the other children to answer. The following are some topics that may be of interest to the children:

- 1. Kind of pet (cat, dog, bird, gerbil)
- 2. Month of birth
- 3. Favorite cereal (hot, cold, none)
- 4. Color of eyes



LESSON ACTIVITY

Before Using the Page

• Prepare a large graph similar to the one shown, using the colors suggested. Show the graph to the children and say, “I have a box with crayons in it. This picture tells about the crayons in the box. How many squares are colored for red? How many red crayons must there be in the box?”

Have one child check the answer by looking in the box and taking out the red crayons to show the other children. Return the crayons to the box. Have the child print the numeral 6 beside the row for red crayons.

| Crayons in the box |  |  |  |  |  |  |  |  |   |
|--------------------|--|--|--|--|--|--|--|--|---|
| red                |  |  |  |  |  |  |  |  | 6 |
| blue               |  |  |  |  |  |  |  |  |   |
| green              |  |  |  |  |  |  |  |  |   |
| yellow             |  |  |  |  |  |  |  |  |   |
| brown              |  |  |  |  |  |  |  |  |   |
| purple             |  |  |  |  |  |  |  |  |   |

Have a child take all the blue crayons from the box, count them, and print the numeral. Ask the children what else must be done. They will likely suggest that one square should be colored for each blue crayon. Ask one child to do this. Complete the graph for the remaining colors. Children will likely start their coloring from the first square in each row because of the pattern already established; if not, remind them to do so.

Tell the children that the picture is called a *graph*. Ask the following questions and discuss how some of the answers may be obtained from the graph without the process of counting.

- “Are there more red or more blue crayons? How many more?”
- “For which color is there the greatest number of crayons?”
- “For which color is there the least number of crayons?”
- “Which color has the same number of crayons as purple?”

Using the Page

• Discuss with the children the shells and their colors. Have them mark one shell at a time and color one square in the appropriate row. After the children are satisfied that no shell has been omitted, have them count the colored squares in each row and print the numeral to the right of the row.

## LESSON OUTCOME

Order the numbers from 0 to 10

## Materials

objects for making sets, eleven cards (20 cm by 30 cm each) showing the numerals 0 to 10, large flash cards for the words *after*, *before*, *between*, numeral cards for 0 to 10 for each child

## Vocabulary

ten, after, before, between, order, number line

## RELATED ACTIVITIES

- Have the children help to make number lines for themselves and also a large number line for display and use in the classroom. Matching number strips will also be needed later. Some suggestions are given on page T321.
- Have the children stack blocks or join Unifix cubes and arrange the "towers" to illustrate the sequence of numbers from one to ten.
- Display numeral cards and the cards for *after*, *before*, and *between*. Have the children respond by holding up their appropriate numeral cards.
- Have some children prepare a set of ten objects as described for *one to nine* in *Related Activities* on page T5. These sets will be used for page 8.
- Have the children make booklets for 0 to 10, a different sheet for each number. Have them draw, or cut and paste, pictures to illustrate each number.

What number comes after?

7 8    2 3    5 6    4 5  
 6 7    9 10    3 4    0 1

What number comes before?

3 4    9 10    0 1    8 9  
1 2    7 8    6 7    2 3

What number comes between?

1 2 3    5 6 7    7 8 9  
 4 5 6    8 9 10    3 4 5  
 0 1 2    6 7 8    2 3 4

Complete.

6 7 8 9 10    0 1 2 3 4  
 3 4 5 6 7    0 2 4 6 8 10

Order of the numbers from 0 to 10

(five) 5

## LESSON ACTIVITY

### Before Using the Page

• Display a set of ten objects and have a child count them. Discuss things that come in tens. Stand the numeral cards for 0 to 10 in any order on the chalkboard ledge. Have a child identify the numeral card for ten. Ask several children to print the numeral 10 on the chalkboard. Have other children place the numeral cards in sequence.

Have children close their eyes while you turn over several of the cards to hide the numerals. See how quickly the children can identify the ones that are hidden. Ask other children, in turn, to hide numerals.

Have children, in turn, choose the card for the number that comes after 1, before 10, between 6 and 8, and so on. The words *after* and *before* imply the number immediately after or immediately before in this instance.

Display one of the numeral cards, say, 7. Ask the children to use the word *between* to tell where 7 belongs. Then ask them to use the word *before*, and finally the word *after*. Repeat several

times for other numbers. Vary the procedure by showing a flash card of the word the children are to use.

• Draw on the chalkboard a line showing 11 equally spaced dots. Print 0 below the first dot and then have children print the numerals to 10 under the appropriate dots. Ask if anyone knows what this line is called (*the number line*). Refer to the number line and ask questions involving the words *after*, *before*, and *between*.

### Using the Page

• Have children read, in turn, the instruction for each set of exercises. Discuss how they should complete the exercises. Direct attention to the numerals in the vertical arrangement at the right. Have the children print the missing numerals.



## LESSON OUTCOME

Describe one mass as *heavier than*, *lighter than*, or of the *same mass as* another

### Materials

balance scales, various objects for comparison of masses, flash cards for the words *heavier*, *lighter*, *same*

### Vocabulary

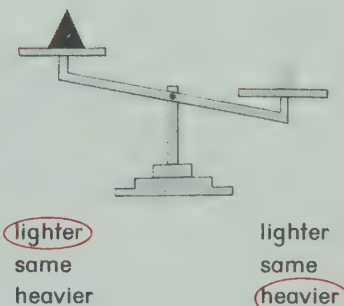
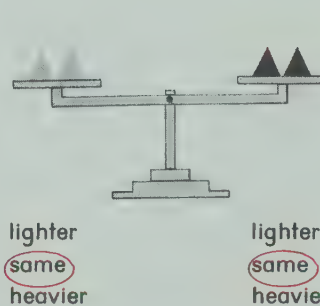
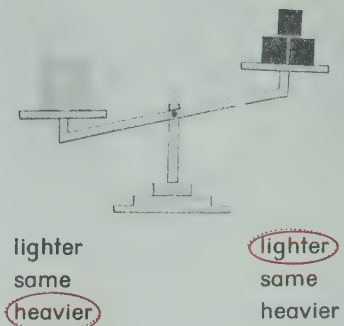
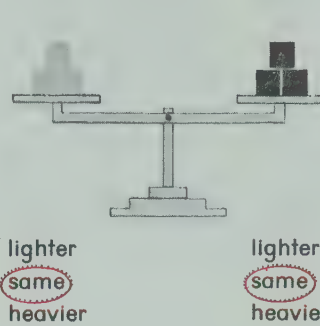
heavier, lighter, same, mass

## RELATED ACTIVITIES

- If there is a teeter-totter in the schoolyard, children may volunteer to use it to compare their masses with each other and with you. Have them make statements using the relations *is heavier than*, *is lighter than*, and *has about the same mass as*. Later, print the stories on chart paper to tell about the discoveries.
- Draw, or print the names of, pairs of objects on a chart. Ask for other suggestions from the children. Have them estimate which object in each pair is heavier and then check by balancing. Have them ring the heavier object in each pair on the chart.

|   |           |
|---|-----------|
| Balance each pair.<br>Ring the heavier one. |           |
| sponge                                      | eraser    |
| hockey puck                                 | golf ball |

Ring the correct word for each.



6 (six)

Comparing masses: *heavier than*, *lighter than*, the *same mass as*

## LESSON ACTIVITY

### Before Using the Page

- Children who have had no previous experience with mass should be given ample opportunity to experiment with the balance scales, either in the play area or in the mathematics centre. (If necessary, make balance scales as described on page T29.) Provide many objects for making comparisons, such as beads, beans, shells, spools, stones, and paper clips. Ask questions similar to the following:  
 “What happens when an object is placed in each pan of the scales?”  
 “Why is one side up and the other side down?”  
 “Does the side holding the heavier object go up or down?”  
 “Does the side holding the lighter object go up or down?”
- Give the children two objects having the same mass, such as pennies or blocks. Ask what happens when one object is placed on each side of the scales.
- Print the words *heavier*, *lighter*, and *same* on the chalkboard. Use flash cards to practise word recognition with the children.

Have one child choose one of the flash cards, say, *heavier*, to identify how the mass of one of a given pair of objects is related to the mass of the other. Repeat for other pairs of objects.

### Using the Page

- Read the instruction at the top of the page. Discuss the first exercise with the children. Ask a child to read the words under each side of the balance scales. Ask the children how they can tell that the yellow objects and the red objects have the same mass. Point out that the word “same” is ringed for each side. Discuss the second exercise in a similar way. Then let the children work independently.

After the children have finished their work, have them tell about each illustration: “The yellow objects are heavier than the red objects because . . .” Direct attention to the last illustration where a large red object is lighter than a small yellow object.

## LESSON OUTCOME

Identify a number one greater than or one less than a given number, to 10

## Materials

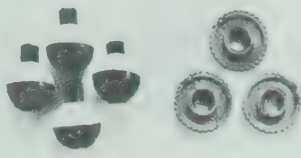
display board and cutouts, ten counters for each child, large number line, numeral cards for 0 to 10 for the teacher and for each child

## Vocabulary

greater than, less than

## RELATED ACTIVITIES

- Name a number and have the children name the number that is one greater than the given number. Then have the children name the number that is one less than the first number named. Continue for many other numbers.
- Prepare a work sheet showing sets of objects. Have the children indicate the number that is one greater than the number of objects in the set. Use a similar sheet for "is less than".
- Discuss any charts or graphs that are on display and ask questions about the information shown.
- Divide the class into two groups in the gym. Have the children in one group hop (clap, bounce a ball) four times. Have the children in the other group do the action one more than four times. Then change the action to one fewer than four times. Repeat the procedure for other numbers less than 10.



4  
3  
4 is one greater than 3



2  
3  
2 is one less than 3

Complete.



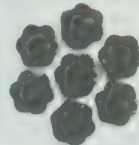
6  
5  
6 is one greater than 5



4  
5  
4 is one less than 5



10  
9  
10 is one greater than 9



6  
7  
6 is one less than 7

What number is one greater than each?

2 3    5 6    7 8    4 5  
9 10    3 4    0 1    6 7

What number is one less than each?

9 10    7 8    0 1    6 7  
3 4    5 6    8 9    2 3

Numbers one greater than or one less than given numbers



(seven) 7

## LESSON ACTIVITY

### Before Using the Page

- Place a set of cutouts on the display board. Ask one child to place another set that has one more than the first set on the display board. Ask how many there are in the second set and how many there are in the first set. Make the appropriate statement; for example, "Six is one greater than five." Repeat several times for different sets.
- Display a set of four cutouts. Have the children use their counters to make a set showing one fewer than this set. Ask how many there are in each set. Make the appropriate statement: "Three is one less than four." Repeat for other sets.
- Refer to the large number line suggested in *Related Activities* on page T9, or draw a number line on the chalkboard. Choose a number. Have a child indicate the number that is one greater than the given number. Then have a child indicate the number that is one less than the given number. Repeat for other numbers.
- Have the children use their numeral cards to show the number that is one greater than eight, one less than two, and so on.

- Print "\_\_\_\_\_ is one greater than \_\_\_\_\_" on the chalkboard. Hold a numeral card beside one of the blanks. Have a child choose the correct numeral card to hold beside the other blank to complete the sentence. Repeat several times. Then change the sentence to "\_\_\_\_\_ is one less than \_\_\_\_\_" and continue the procedure.

### Using the Page

- Begin by discussing the two examples at the top of the page with the children. For the first example, they may say, "The first set has four objects and the second set has three objects. Four is one greater than three." Have the children make similar statements for the second example. Discuss what is required for the remaining part of the page. Then let the children work independently.
- After the children have completed the page, you may wish to present problems of the following type:  
1. Find the set of pink beads. How many are there? Find the set of white shells. How many are there? Is ten greater than or less than six?



LESSON OUTCOME

Identify numbers greater than or less than a given number, to 10

Materials

pictures of sets having from zero to ten members, numeral cards for 0 to 10 for display, number line marked to show 0 to 10

RELATED ACTIVITIES

- Have the children color number strips from copies of page T344 to illustrate the numbers from one to ten. These strips can be pasted in order on paper to form a ‘flight of steps’.
- Keep a record of absentees. Discuss whether the number of boys absent is greater than or less than the number of girls absent.
- Prepare a work sheet that asks the children to draw fewer than four houses, more than five triangles, and so on. Have them record the number of objects they drew and discuss their choices.
- Record each child’s name. Have each child indicate the number of children in her/his family. Discuss which families have more children than John’s family, fewer children than Mary’s family, and the same number of children as Pat’s family. You may wish to have the children prepare a graph showing the number of families with one child, two children, and so on.



Ring the correct words.

2 is greater than 1  
is less than

4 is greater than 7  
is less than

4 is greater than 2  
is less than

3 is greater than 5  
is less than

6 is greater than 9  
is less than

8 is greater than 7  
is less than

Ring the numbers that are greater than

△ 4 3 7 9 2 8

△ 7 10 3 5 8 9

△ 3 8 1 4 2 6

△ 8 5 9 6 10 7

△ 1 2 0 4 8 3

Check the numbers that are less than

△ 6 3 7 2 9 4

△ 9 10 4 1 5 8

△ 5 6 2 0 9 7

△ 2 0 8 5 1 4

△ 0 9 6 2 7 10

8 (eight)

Using is greater than and is less than with numbers

LESSON ACTIVITY

Before Using the Page

- Use the sets of pictures the children made as suggested in *Related Activities* on pages T5 and T9. Display sets of zero to ten objects on the chalkboard ledge. Hold up the picture of seven objects. Ask how many objects there are in the set. Have children find the sets that have more than seven objects. Have them discuss their choices by saying, ‘Eight is greater than seven, nine is greater than seven, ten is greater than seven.’ Repeat the procedure using other sets. When the children seem to be able to do this well, change to the choosing of sets that have fewer objects than the given set. Have the children discuss their choices by saying, for example, ‘Four is less than eight.’
- Use a number line marked to show 0 to 10. Point to the 4. Have the children state which numbers are greater than four. As they name the numbers, point to each numeral on the number line. Repeat several times and then have the children find numbers less than a given number. At the end of this activity, lead the children to suggest that they move to the right on the number

line to find numbers greater than a given number and to the left to find numbers less than a given number.

- Print the following side by side on the chalkboard.

\_\_\_\_\_ is greater than \_\_\_\_\_ \_\_\_\_\_ is less than \_\_\_\_\_

Choose pairs of numeral cards. Have children hold them beside the blanks to make true statements. Ask children to read each statement.

Using the Page

- Read the words with the children to ensure that they know what to do for each of the three sets of exercises. Discuss the first exercise in each set and have the children trace over the answers indicated. Then let the children work independently. Children may use the number line at the top of the page for assistance.

Notice the last exercise in the column at the right in which none of the numbers in the row is less than zero, and thus none will be checked.

## LESSON OUTCOME

Recognize and use the symbol for *is greater than*

### Materials

display board, cutouts, flash card for *is greater than*, the symbol  $>$  for the display board, numeral cards for 0 to 10, hand puppet

### RELATED ACTIVITIES

- Have children form sentences on the flannel board using felt numerals for 0 to 10 and the symbol  $>$  cut from felt. Ask them to read each completed sentence.
- Challenge the children to complete sentences similar to the following in as many ways as possible for the numbers from 0 to 10. For example, for  $5 > \underline{\quad}$ , there are five possibilities:  $5 > 4$ ;  $5 > 3$ ;  $5 > 2$ ;  $5 > 1$ ; and  $5 > 0$ .

$$5 > \underline{\quad} \quad \underline{\quad} > 6$$

$$3 > \underline{\quad} \quad \underline{\quad} > 8$$

Complete.



4



2

4 is greater than 2

4  $>$  2



6



3

6 is greater than 3

6  $>$  3



5



3

5 is greater than 3

5  $>$  3



6



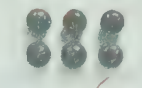
4

6 is greater than 4

6  $>$  4



7



6

7 is greater than 6

7  $>$  6



9



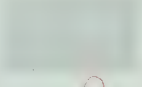
5

9 is greater than 5

9  $>$  5



3



0

3 is greater than 0

3  $>$  0



8



1

8 is greater than 1

8  $>$  1

5  $>$  2

10  $>$  7

9  $>$  3

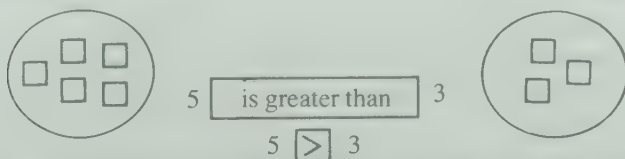
Introduction to the symbol for *is greater than*

(nine) 9

## LESSON ACTIVITY

### Before Using the Page

- Place a set of five and a set of three cutouts on the display board. Ask how many there are in each set. Place the numeral below each set. Ask which number is greater, 5 or 3. Place the flash card for *is greater than* between the numerals. Under this, show 5 and 3 again. Place the symbol  $>$  between them. Tell the children that this symbol is used as a short way of showing "is greater than".



Display other pairs of sets. Place  $>$  between the two numerals. Have children read the statements.

- If you have a hand puppet with a movable mouth, place the puppet between a pair of numeral cards. Ask the children to pretend that the puppet's mouth represents the symbol  $>$ . Ask

the children how they can tell that the puppet seems to be very hungry. (The puppet's mouth opens toward the greater number.)

- Display pairs of numeral cards, leaving space for the symbol  $>$ . Have children insert the symbol and then make a statement about the two numbers.
- Write pairs of numerals on the chalkboard. Have children write the symbol  $>$  between the numerals of each pair and then make a statement about the two numbers.

### Using the Page

- Read the instruction at the top of the page. Discuss the first exercise with the children. Ask how many shells there are in each set. Have a child read the statement "4 is greater than 2". Ask another child to read "4  $>$  2" and to explain the meaning of the symbol  $>$ .

Have children explain how to complete the second exercise. Guide them in completing the exercise and then let them work independently. You may wish to point out that no sets are shown for the three exercises at the bottom of the page.

After the children have completed the page, have them read aloud several of the statements.



LESSON OUTCOME

Recognize and use the symbol for *is less than*


Materials


display board, cutouts, flash card for *is less than*, the symbol < for the display board, numeral cards for 0 to 10, hand puppet


RELATED ACTIVITIES

- Have children form sentences on the flannel board using felt numerals for 0 to 10 and the symbol < cut from felt. Ask them to read each completed sentence.
- Challenge the children to complete sentences similar to the following in as many ways as possible for the numbers from 0 to 10. For example, for  $7 < \underline{\hspace{1cm}}$ , there are three possibilities:  $7 < 8$ ;  $7 < 9$ ; and  $7 < 10$ .  
 $7 < \underline{\hspace{1cm}}$                        $\underline{\hspace{1cm}} < 3$   
 $4 < \underline{\hspace{1cm}}$                        $\underline{\hspace{1cm}} < 7$

Complete.





  
2

  
3

2 is less than 3


2 < 3


  
4

  
6

4 is less than 6


4 < 6


  
3

  
7

3 is less than 7

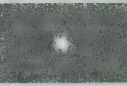
3 < 7

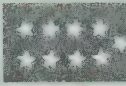
  
2

  
8

2 is less than 8


2 < 8


  
1

  
9

1 is less than 9

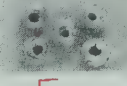
1 < 9


  
0

  
5

0 is less than 5


0 < 5


  
5

  
6

5 is less than 6

5 < 6

  
7

  
8

7 is less than 8

7 < 8

2 < 4

3 < 9

6 < 10


10 (ten)

Introduction to the symbol for *is less than*


LESSON ACTIVITY

Before Using the Page

- Place a set of two and a set of six cutouts on the display board. Ask how many there are in each set. Place the numeral below each set. Ask which number is less, 2 or 6. Place the flash card for *is less than* between the numerals and read the statement: “2 is less than 6”. Review that in the previous lesson, the children learned to use the symbol > as a short way of showing “is greater than”. Tell the children that there is a symbol for a short way of showing “is less than”. Place the symbol < between the numerals 2 and 6.



2 is less than 6



2 < 6

Display other pairs of sets. Place < between the two numerals. Have children read the statements.

- Use the hand puppet as suggested in the previous lesson to emphasize that the symbol < opens toward the greater number.
- Display pairs of numeral cards, leaving space for the symbol <. Have children insert the symbol and then make a statement about the two numbers.
- Write pairs of numerals on the chalkboard. Have children write the symbol < between the numerals of each pair and then make a statement about the two numbers.

Using the Page

- Read the instruction at the top of the page. Discuss the first exercise with the children. Ask how many shells there are in each set. Have a child read the statement “2 is less than 3”. Ask another child to read “2 < 3” and to explain the meaning of the symbol <.

Have children explain how to complete the second exercise. Guide them in completing the exercise and then let them work independently. You may wish to point out that no sets are shown for the three exercises at the bottom of the page.

After the children have completed the page, have them read aloud several of the statements.

# LESSON OUTCOME

Demonstrate an understanding of the symbols  $>$  and  $<$

## Materials

display board, cutouts, numeral cards for 0 to 10, the symbol  $<$  for the display board, two hinged paper strips

## RELATED ACTIVITIES

- Write these on the chalkboard:

\_\_\_\_\_  $>$  \_\_\_\_\_ and \_\_\_\_\_  $<$  \_\_\_\_\_

Give children two numeral cards to hold beside the blanks, first for one statement and then for the other. Have the children read the statements.

- You may wish to have children play the game "Comparison" described on page T29 for two players.

- Children who have difficulty drawing the correct symbol may find the following steps helpful.

1. Mark one dot by the numeral for the lesser number.

7     • 4                      3     • 5

2. Mark two dots by the numeral for the greater number.

7     • 4                      3     • 5

3. Join the first dot to each of the other dots.

7     • 4                      3     • 5

- Discuss the last two rows of exercises on page 11 with the children. Lead them to observe pairs of sentences such as  $7 > 5$  and  $5 < 7$ . Then ask the children to create similar pairs of exercises.

## LESSON ACTIVITY

### Before Using the Page

- Place a set of two and a set of five cutouts on the display board. Have children place the appropriate numeral below each set. As you point to the numerals, ask, "Is two less than five or is two greater than five?" Have a child place the symbol  $<$  between the numerals. Have the children read the statement.

As the children watch, interchange the two sets of cutouts. The children will likely suggest that the numerals 2 and 5 must also be interchanged. As you point to the numerals, ask, "Is five less than two or is five greater than two?" Point out that the statement is not correct and ask why. (The symbol should open toward the greater number.) Lead the children to suggest that if the symbol  $<$  is turned around, it will show the symbol  $>$ . Ask a child to turn the symbol around. Have the children read the corresponding statement.



- Show pairs of numerals, leaving space for the symbol  $>$  or  $<$ . Have children insert the correct symbol and then read the statement. Many children have difficulty remembering the proper direction for the symbol. Others tend to place the symbol correctly but then read the statement from right to left. Use two paper strips hinged at one end to show how the symbol when correctly positioned points to the lesser number and opens toward the greater number. Help the children to read the statement from left to right by pointing to each symbol as they read.

### Using the Page

- Discuss the first two sets of beads with the children. Ask how many beads there are in each set. Ask, "Is seven greater than four or is seven less than four?" Review the fact that the symbol  $>$  points to the 4, the lesser number, and opens toward the 7, the greater number. Discuss the two sets of gray buttons in a similar manner. Then let the children work independently.



LESSON OUTCOME

Demonstrate an understanding of the ordinal number concepts to *tenth*; recognize the ordinal number names *first* to *tenth*

Materials

ten different objects, flash cards for the names of the ordinal numbers from *first* to *tenth*, chart showing cardinal and ordinal number words and numerals for the numbers to ten, crayons for each child

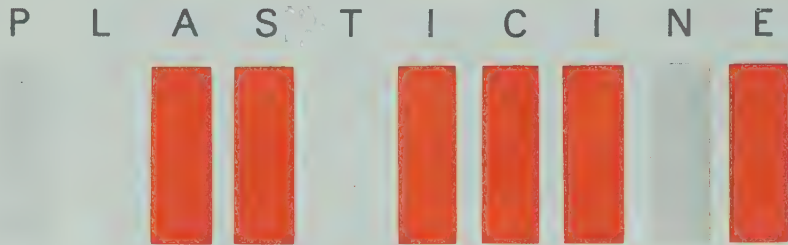
Vocabulary

ordinal number words *first* to *tenth*, names of the days of the week

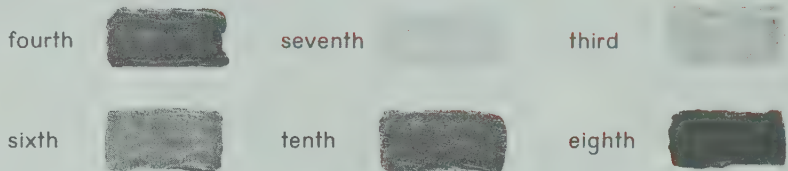
RELATED ACTIVITIES

- Many more words can be made from the letters of the word *Plasticine*. Have children find words and tell the positions of the letters used. Then have other children form the words. The following are some examples: can, pan, tan, sat, pat, let, net, pet, set, lip, sip, tip, ate, slap, salt, last, past, plastic.

|       |        |       |        |       |       |         |        |       |       |
|-------|--------|-------|--------|-------|-------|---------|--------|-------|-------|
| one   | two    | three | four   | five  | six   | seven   | eight  | nine  | ten   |
| 1     | 2      | 3     | 4      | 5     | 6     | 7       | 8      | 9     | 10    |
| first | second | third | fourth | fifth | sixth | seventh | eighth | ninth | tenth |



Color the shapes.



Make words from these letters of PLASTICINE.

|         |        |        |   |   |   |
|---------|--------|--------|---|---|---|
| first   | third  | second | P | A | L |
| seventh | third  | fifth  | C | A | I |
| fourth  | sixth  | fifth  | S | I | I |
| fifth   | tenth  | ninth  | I | E | N |
| second  | sixth  | ninth  | L | L | N |
| first   | eighth | tenth  | P | L | E |
|         |        | fourth |   |   | S |

12 (twelve)

Using ordinal number concepts to *tenth*

LESSON ACTIVITY

Before Using the Page

- Ask ten children to stand in a row. Establish which child is first in the row. Ask questions similar to the following: "Is the third child wearing green?" "What color hair does the fifth child have?"
- Place ten different objects on a table. Have a child place them in a row and indicate the first object in the row. Ask questions similar to these: "Which object is seventh in the row?" "Is the ball the third object in the row?" "Is the fourth object bigger than or smaller than the sixth object?" "Interchange the second object and the fifth object."
- Use the days of the week as a reference for *first* to *seventh*; for example, "What is the fifth day of the week?" or "Which day of the week is Tuesday?" You can also use the calendar to review the concepts *before*, *after*, and *between*.
- Display a chart like the one shown. Use it to discuss similarities and differences between the words for the cardinal

numbers and the words for the ordinal numbers. Some are similar (ten, tenth), but others are quite different (one, first).

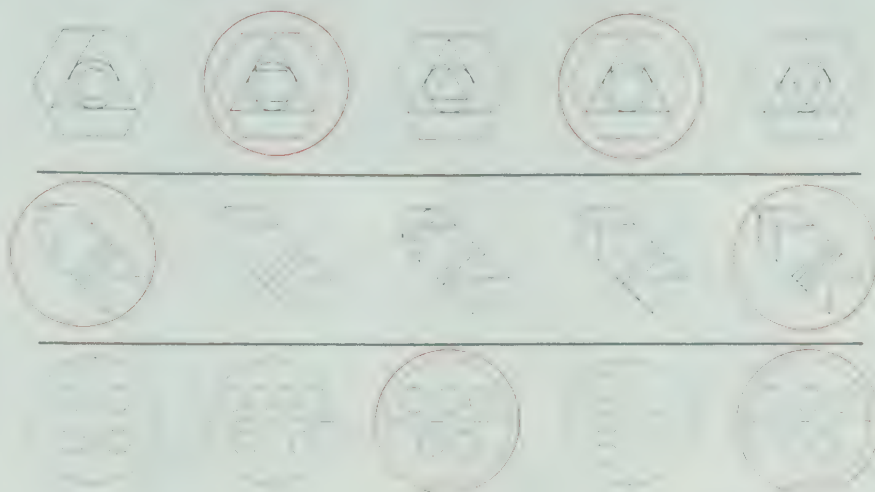
- Use flash cards showing the words for the ordinal numbers and work with the children to practise word recognition.

|       |    |         |
|-------|----|---------|
| one   | 1  | first   |
| two   | 2  | second  |
| three | 3  | third   |
| four  | 4  | fourth  |
| five  | 5  | fifth   |
| six   | 6  | sixth   |
| seven | 7  | seventh |
| eight | 8  | eighth  |
| nine  | 9  | ninth   |
| ten   | 10 | tenth   |

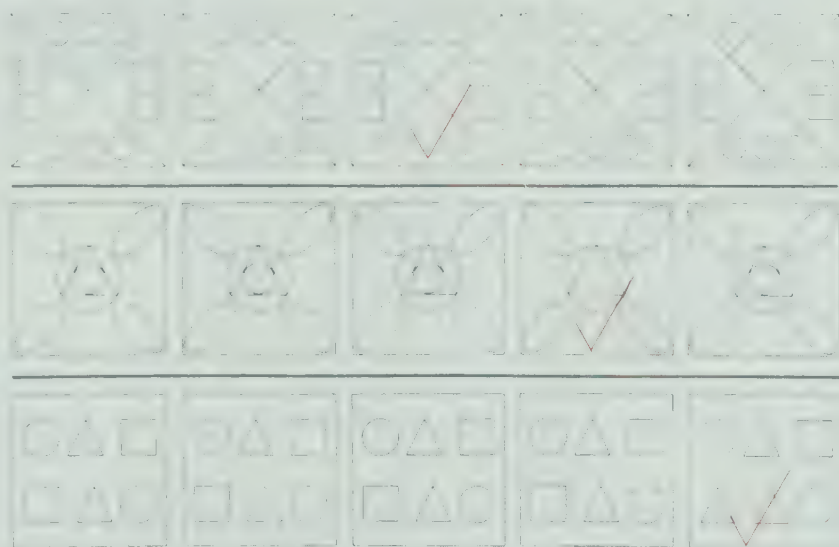
Using the Page

- You may wish to have the children identify each of the ten animals at the top of the page by name first. Then ask questions such as: "What is the fourth animal?" "In which place is the horse?"
- For the second part of the page, the children are to color shapes, but to do so they must associate each ordinal number word with the appropriate shape.
- For the third part of the page, the children are to identify the words formed from the letters of the word *Plasticine*.

Ring the two that are alike.



Check the one that is different.



Recognizing likenesses and differences

(thirteen) 13

## LESSON OUTCOME

Recognize likenesses and differences in pictures

### Materials

attribute blocks or suitable substitute, crayons for each child

### Vocabulary

thick, thin, circle, rectangle, square, triangle

## RELATED ACTIVITIES

- You may wish to use one or more of the games suggested for attribute blocks on page T29.
- Separate the attribute blocks by shape to enable four groups of children to play this game at the same time. Ask the children to close their eyes. One child removes a block. The other children look at the blocks left and try to name the missing one. The child who names correctly the four attributes (color, shape, size, thickness) may remove the next block.
- Prepare a set of cards for identifying likenesses. For each card make an identical card. Shuffle and arrange the cards face down in an array. The children turn over a pair of cards and keep them if they match, or return them face down if they do not match.
- Use page 13 to review ordinal number concepts to *fifth*. Ask, for example, which shape in a row is the same as the first one, or which shape is different from the others in the row.

## LESSON ACTIVITY

### Before Using the Page

- Recognition of likenesses and differences is one aspect in the development of logical reasoning. Through activities with attribute blocks, children encounter experiences in logical reasoning. If you are not familiar with attribute blocks, a description is given on page xxxi.

First, give the children plenty of time for free play with the attribute blocks. Unless they are allowed to use their own imagination and creativity first, they will be reluctant to participate in any organized games.

- Spread the attribute blocks out on the floor. Play the game "Show Me". A child who shows you a correct shape may keep it until the game ends.

Conduct the game as follows: "Show me a triangular shape. Show me a different triangular shape. How are they different?" (One is blue and one is red, or one is thick and one is thin.)

Continue with the following: "Show me a blue square shape. Show me a circular shape that is not blue. Show me a rectan-

gular shape that is not small. Show me a thin square shape. Show me another thin square shape. In what way are the two thin square shapes different?"

When the game ends, ask the following: "If we put all the thin shapes in a pile over there, what could we say about all the shapes left in this pile? Suppose, instead, we were to put all the small shapes in one pile over there. What could we say about all the shapes left in this pile?"

### Using the Page

- Read the two instructions with the children. For the first three exercises, the children are to ring the two drawings in each row that are identical. For the last three exercises, the children are to use a  $\checkmark$  to indicate the drawing in each row that is different from the others.

- After the children have completed the exercises, you may wish to have them color the two drawings that are identical in each of the first three rows so that the drawings will be identical in size, shape, and color. Similarly, you may have the children color the four drawings that are identical in each of the last three rows.



## LESSON OUTCOME

Write number sentences to show addition, sums to 9

### Materials

display board and nine cutouts, nine paper flowers and a vase, nine counters and a container, nine counters for each child

### Vocabulary

join, number sentence, plus, equals, sum

## RELATED ACTIVITIES

- Prepare an addition table for sums to 9. Show the children how to select a number in the first column, say, 4, to add to a number in the row at the top, say, 2. Show how to trace along the "4" row and down the "2" column to find the square in which to print 6 for the sum  $4 + 2$ . (The number board is a useful aid when set up as an addition table as described on page T321.)

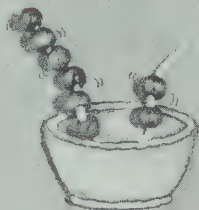
| + | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 |   |   |   |   |   |   |   |   |   |   |
| 1 |   |   |   |   |   |   |   |   |   |   |
| 2 |   |   |   |   |   |   |   |   |   |   |
| 3 |   |   |   |   |   |   |   |   |   |   |
| 4 |   |   | 6 |   |   |   |   |   |   |   |
| 5 |   |   |   |   |   |   |   |   |   |   |
| 6 |   |   |   |   |   |   |   |   |   |   |
| 7 |   |   |   |   |   |   |   |   |   |   |
| 8 |   |   |   |   |   |   |   |   |   |   |
| 9 |   |   |   |   |   |   |   |   |   |   |

$$4 + 2 = 6$$

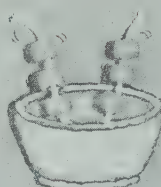
Complete the number sentences.



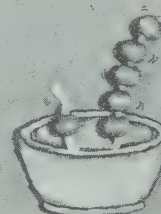
$$2 + 3 = 5$$



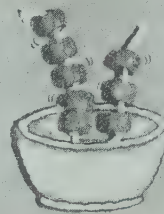
$$6 + 2 = 8$$



$$3 + 3 = 6$$



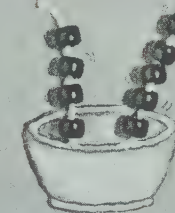
$$1 + 5 = 6$$



$$5 + 3 = 8$$



$$3 + 4 = 7$$



$$4 + 5 = 9$$



$$7 + 2 = 9$$



14 (fourteen)

Writing addition sentences, sums to 9

## LESSON ACTIVITY

### Before Using the Page

- Display a set of two cutouts and a set of three cutouts. Ask how many there are in each set. Have one child join the two sets to make a new set. Ask how many there are in the new set. Use other examples, having children help to choose the two sets that are to be joined.
- Have the children use their counters to make a set of four and then a set of two. Have them join the two sets to make a new set. Ask how many there are in the new set. Repeat with other pairs of sets.
- Hold two paper flowers in one hand and seven in the other. Ask the children to tell you how many flowers there are in each hand. Place all the flowers in a vase. Have one child count the flowers in the vase. Write "2 flowers and 7 flowers together is the same as 9 flowers" on the chalkboard. Ask the children if they know a number sentence for the story. Write  $2 + 7 = 9$ . Have the children read it as "Two plus seven is the same as nine," and then as "Two plus seven equals nine." Use other

groups of flowers and write the corresponding number sentences.

- Place nine counters on a table. Place a container beside the counters. Write  $\underline{\quad} + \underline{\quad} = \underline{\quad}$  on the chalkboard. Have one child take some counters, drop them into the container, and print the appropriate numeral in the first blank. Have another child take some counters, drop them into the same container, and print the appropriate numeral in the second blank. Ask a third child to count the counters in the container and write the sum. (The child may write the sum first and then check it by counting the counters in the container.) Have one child read the completed number sentence. Remove the counters from the container and begin again. This activity prepares the children for the exercises on the page.

### Using the Page

- Read the instruction with the children. Discuss what is shown in the first picture and have the children trace over the three dotted numerals. Then let the children work independently.

## LESSON OUTCOME

Complete addition sentences for sums to 9

### Materials

overhead projector, counters, counters for each child

### Vocabulary

addition sentence

## RELATED ACTIVITIES

- Have the children work in small groups using flash cards showing an addition phrase on one side and the sum on the reverse side. Children take turns being the leader to display the cards and check the sums named by the other children. The children may be organized so that one group practises sums for which 2 is one of the addends ( $7 + 2$ ,  $6 + 2$ ,  $5 + 2$ , . . . ,  $1 + 2$ ), another group practises sums for which 3 is an addend, and so on. Another time, the children may be organized to practise the addition phrases for two particular sums, for example, sums of 3 and sums of 5.

- You may wish to have the children make a bar graph to show how many times each of the numbers 0 to 9 appears as a sum on page 15. Provide them with copies of page T343 for the graph.

Complete the number sentences.

$$2 + 1 = \underline{3}$$

$$3 + 2 = \underline{5}$$

$$4 + 1 = \underline{5}$$

$$2 + 2 = \underline{4}$$

$$1 + 4 = \underline{5}$$

$$4 + 4 = \underline{8}$$

$$6 + 1 = \underline{7}$$

$$3 + 1 = \underline{4}$$

$$5 + 2 = \underline{7}$$

$$1 + 3 = \underline{4}$$

$$2 + 7 = \underline{9}$$

$$7 + 1 = \underline{8}$$

$$5 + 1 = \underline{6}$$

$$1 + 2 = \underline{3}$$

$$2 + 4 = \underline{6}$$

$$4 + 0 = \underline{4}$$

$$6 + 3 = \underline{9}$$

$$0 + 8 = \underline{8}$$

$$1 + 7 = \underline{8}$$

$$5 + 3 = \underline{8}$$

$$1 + 7 = \underline{8}$$

$$4 + 3 = \underline{7}$$

$$3 + 5 = \underline{8}$$

$$6 + 2 = \underline{8}$$

$$0 + 5 = \underline{5}$$

$$4 + 2 = \underline{6}$$

$$3 + 3 = \underline{6}$$

$$2 + 3 = \underline{5}$$

$$3 + 6 = \underline{9}$$

$$2 + 5 = \underline{7}$$

$$5 + 4 = \underline{9}$$

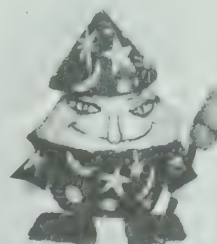
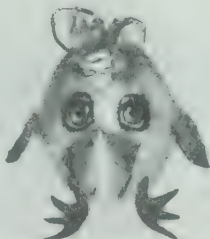
$$6 + 0 = \underline{6}$$

$$7 + 2 = \underline{9}$$

$$2 + 6 = \underline{8}$$

$$8 + 1 = \underline{9}$$

$$3 + 4 = \underline{7}$$



Completing addition sentences, sums to 9

(fifteen) 15

## LESSON ACTIVITY

### Before Using the Page

- Use the overhead projector with counters such as transparent, colored bingo chips. Display sets of counters on the overhead projector as you tell the children a story. Use names for several children in your class. Say, for example, "Sean baked two cookies in the toy oven." (Show two counters.) "Then he baked three more cookies." (Show three more counters.) "How many cookies did Sean bake in all?" Have children write on the chalkboard the number sentence that tells the story ( $2 + 3 = 5$ ). Have other children read the number sentence. Remind the children that a number sentence that shows addition is called an *addition sentence*. Review that the symbol  $=$  is read "equals" and that it means "is the same as". Repeat with other examples. Have children suggest stories for you to show using different sets of counters.

- Have the children use counters such as elevator beads as described on page xxxi. Name pairs of numbers and have the children use their counters to find the sums. Then encourage the children to use their counters only for sums they cannot recall

immediately. However, include several relatively easy examples, such as  $1 + 2$  and  $2 + 2$ , so that even less capable children may feel a measure of success. Story situations similar to those suggested for the first activity are also suitable for this activity.

### Using the Page

- Have the children count the blue beads shown across the top of the page. Show them how the beads can be used as counters, if needed, to find a sum.
- Read the instruction with the children. Tell them that after they write each sum, they should read the addition sentence silently.





## LESSON OUTCOME

Recognize that the order of the addends does not affect the sum

## Materials

number line, number strips – two each of strips 1 to 4 and one each of strips 5 to 9

## RELATED ACTIVITIES

- Have the children write an addition sentence illustrated by a domino on which the number of dots is less than ten. Then have them turn the domino around and write the related addition sentence. Children may trade dominoes and write the corresponding addition sentences.



$$2 + 3 = 5$$



$$3 + 2 = 5$$

- Prepare a work sheet having exercises of the types shown. First, the children are to write the addition sentences illustrated by the beads. Next, they are to draw rows of beads to illustrate related addition sentences and then complete them.

|                             |   |  |   |       |
|-----------------------------|---|--|---|-------|
|                             | + |  | = | _____ |
|                             | + |  | = | _____ |
| $5 + 2 = \underline{\quad}$ |   |  |   |       |
| $2 + 5 = \underline{\quad}$ |   |  |   |       |

$$2 + 3 = 5$$



$$3 + 2 = 5$$

Complete the number sentences.

$$1 + 3 = \underline{4}$$

$$3 + 1 = \underline{4}$$

$$4 + 2 = \underline{6}$$

$$2 + 4 = \underline{6}$$

$$5 + 1 = \underline{6}$$

$$1 + 5 = \underline{6}$$

$$3 + 4 = \underline{7}$$

$$4 + 3 = \underline{7}$$

$$6 + 0 = \underline{6}$$

$$0 + 6 = \underline{6}$$

$$5 + 2 = \underline{7}$$

$$2 + 5 = \underline{7}$$

$$1 + 7 = \underline{8}$$

$$7 + 1 = \underline{8}$$

$$2 + 6 = \underline{8}$$

$$6 + 2 = \underline{8}$$

$$4 + 5 = \underline{9}$$

$$5 + 4 = \underline{9}$$

Changing the order of addends, sums to 9

(seventeen) 17

## LESSON ACTIVITY

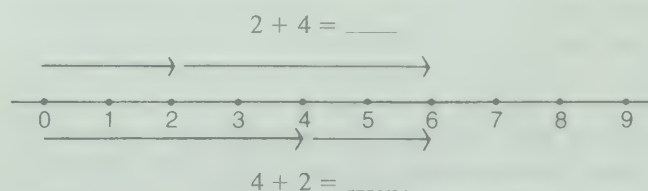
### Before Using the Page

- Play the game "If I Know". The leader says, "If I know that two plus three equals five, what do you know?" The first player to say, "Three plus two equals five," becomes the leader.
- Write  $3 + 5 = \underline{\quad}$  on the chalkboard. Use a number line and matching number strips as for page 16. Have children choose strips and hold them to show  $3 + 5$  on the number line, read the sum, and complete the addition sentence.

Tell the two children who are holding the strips that you would like them to change places (holding the same number strips) and then hold their strips on the number line. Ask the children how the addition sentence must be changed. Write the new addition sentence,  $5 + 3 = \underline{\quad}$ , below the first one. Have a child read the sum and complete the sentence. Ask the children what they notice about the two sums. Ask if they think this will be true for other pairs of numbers.

- Draw a number line on the chalkboard and write the addition sentences shown. Ask a child to draw arrows above the number line to illustrate the first sentence. Help a second child to draw

arrows below the same number line to illustrate the second sentence. Complete the sentences. Repeat for other examples.



- Draw a number line on the chalkboard. Draw pairs of arrows above and below the line to illustrate a pair of related addition sentences. Have the children state the corresponding sentences. Repeat for other examples.

### Using the Page

- Discuss the two related addition sentences illustrated at the top of the page. Read the instruction with the children and then let them work independently. Children who have difficulty with the six pairs of related addition sentences at the bottom of the page may refer to the number line at the top of the page.



## LESSON OUTCOME

Use the vertical form for addition

### Materials

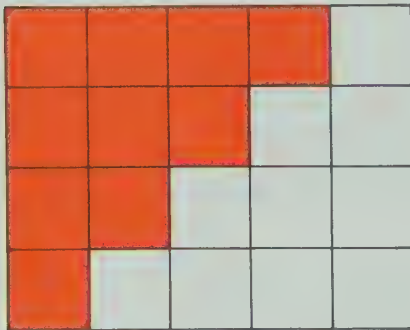
display board and cutouts, nine counters for each child

### Vocabulary

vertical form, add

## RELATED ACTIVITIES

- On squared paper have the children illustrate addition facts in vertical form for a given sum to 9. The facts for a sum of 4 are shown below.



|     |     |     |     |     |
|-----|-----|-----|-----|-----|
| 4   | 3   | 2   | 1   | 0   |
| + 0 | + 1 | + 2 | + 3 | + 4 |
| —   | —   | —   | —   | —   |
| 4   | 4   | 4   | 4   | 4   |

- Prepare cards for the children to practise addition and at the same time reinforce the recognition of simple words as described on page T29.

Add.

|   |   |
|---|---|
| $\begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$ | $\begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array}$ |
|---|---|

|   |   |   |   |   |
|---|---|---|---|---|
| $\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array}$ | $\begin{array}{r} 1 \\ + 4 \\ \hline 5 \end{array}$ | $\begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$ | $\begin{array}{r} 5 \\ + 0 \\ \hline 5 \end{array}$ | $\begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array}$ |
| $\begin{array}{r} 2 \\ + 4 \\ \hline 6 \end{array}$ | $\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array}$ | $\begin{array}{r} 5 \\ + 1 \\ \hline 6 \end{array}$ | $\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$ | $\begin{array}{r} 1 \\ + 7 \\ \hline 8 \end{array}$ |
| $\begin{array}{r} 5 \\ + 3 \\ \hline 8 \end{array}$ | $\begin{array}{r} 8 \\ + 1 \\ \hline 9 \end{array}$ | $\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$ | $\begin{array}{r} 0 \\ + 4 \\ \hline 4 \end{array}$ | $\begin{array}{r} 7 \\ + 2 \\ \hline 9 \end{array}$ |
| $\begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$ | $\begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$ | $\begin{array}{r} 1 \\ + 6 \\ \hline 7 \end{array}$ | $\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$ | $\begin{array}{r} 2 \\ + 5 \\ \hline 7 \end{array}$ |
| $\begin{array}{r} 9 \\ + 0 \\ \hline 9 \end{array}$ | $\begin{array}{r} 0 \\ + 3 \\ \hline 3 \end{array}$ | $\begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$ | $\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$ | $\begin{array}{r} 6 \\ + 3 \\ \hline 9 \end{array}$ |
| $\begin{array}{r} 2 \\ + 6 \\ \hline 8 \end{array}$ | $\begin{array}{r} 4 \\ + 2 \\ \hline 6 \end{array}$ | $\begin{array}{r} 3 \\ + 5 \\ \hline 8 \end{array}$ | $\begin{array}{r} 6 \\ + 2 \\ \hline 8 \end{array}$ | $\begin{array}{r} 1 \\ + 8 \\ \hline 9 \end{array}$ |

18 (eighteen)

Using the vertical form for addition, sums to 9

## LESSON ACTIVITY

### Before Using the Page

- The vertical form for addition provides the children with another way of writing a number fact, and the introduction of this concept provides a review of addition facts.

Place three cutouts on the display board. Ask how many there are in the set and show the numeral beside the set. Place four cutouts below the first set. Ask how many there are in the set and show the numeral below the 3. Draw one line below the sets and another below the numerals.

Ask how many cutouts there would be if the two sets were joined. Have one child place a set of seven cutouts below the line for the sets. Have another child show the numeral 7 below the line for the vertical arrangement. Write the symbol + in front of the 4. Have the children read the vertical form as "Three plus four equals seven."

|         |     |
|---------|-----|
| ○○○     | 3   |
| ○○○○    | + 4 |
| —       | —   |
| ○○○○○○○ | 7   |

- Draw two sets arranged vertically on the chalkboard. Have one child write the numerals in vertical form. If the symbol + has been omitted, ask the other children what must be printed in front of the second numeral. Ask a child to draw a line below the sets and show the set that would be formed by joining the two sets. Ask another child to draw a line below the numerals and write the sum. Have a child read the addition fact. Repeat the procedure for other examples. (Include a set of zero objects as one of the two sets.)

- Write three or four addition facts in vertical form on the chalkboard. Have the children copy them and write the sums.

### Using the Page

- Have the children read the word "Add" at the top of the page. Discuss the first illustrated exercise and then have the children trace over the dotted 3. Then discuss the second illustrated exercise and have the children write the sum. Let the children continue on their own. Children who need assistance may use the daisies at the side of the page as counters.

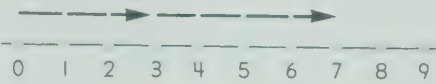
Complete.



$$5 + 4 = \underline{9}$$



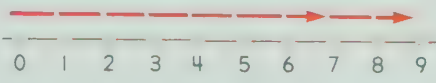
$$4 + 2 = \underline{6}$$



$$\underline{3} + \underline{4} = \underline{7}$$



$$\underline{2} + \underline{5} = \underline{7}$$



$$7 + 2 = \underline{9}$$



$$6 + 3 = \underline{9}$$

Addition practice sums to 9

Add.

$$\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 6 \\ + 0 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ + 1 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 3 \\ + 5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 \\ + 6 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 5 \\ + 0 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 7 \\ + 1 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 5 \\ + 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 \\ + 7 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 2 \\ + 4 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 2 \\ + 7 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 6 \\ + 2 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 2 \\ + 6 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 0 \\ + 4 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 1 \\ + 8 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 1 \\ + 5 \\ \hline 6 \end{array}$$

(nineteen) 19

## LESSON OUTCOME

Complete basic addition facts for sums to 9

## Materials

cards showing addition phrases for sums to 9, number line for each child, overhead projector (optional)

## RELATED ACTIVITIES

- Draw a number line on a strip of wood. Use finishing nails to mark the positions for the numerals. For showing  $2 + 3$ , for example, place a bead on the nail for 2, count three units to the right, and place another bead on the nail for 5. This device helps to prevent the children from counting two units, counting three more units, and then starting again and counting from one to five.

Have the children work with this device in their spare time. Their competency in using the number line will be an asset when they begin later work with rulers in measurement activities.

## LESSON ACTIVITY

## Before Using the Page

- Draw a number line on the chalkboard, or prepare an acetate transparency showing several number lines. Use the overhead projector to project the image directly onto the chalkboard. Prepare several cards showing addition phrases such as  $2 + 3$ ,  $3 + 4$ ,  $4 + 1$ ,  $5 + 2$ , and distribute them to as many children. Have each child, in turn, use the number line on the chalkboard to illustrate what is shown on her/his card. Have the other children interpret the illustration. Ask children to write the addition sentences on the chalkboard.

Have the children work individually or in pairs using their own number lines to demonstrate the addition phrase on each card. You may wish to show the children how one long arrow is a more convenient way to move from 0 to 4, for example, rather than marking four separate steps. Similarly, after reaching 4, another long arrow may be used while counting "one, two, three" for a second move of three, for example.

$$4 + 3 = 7$$



## Using the Page

- Discuss the first exercise with the children and have them trace over the dotted 9. Then have the children interpret each of the other exercises and complete the addition sentence. Point out that in the last two exercises the children are to draw the arrows necessary to illustrate the addition sentences and then complete them.

- Have the children complete the addition exercises in vertical form after they have completed all the exercises involving number lines. They may refer to the number lines, if necessary, for help in completing these exercises. After the children have finished, ask them to find pairs of exercises that show the same addends in the opposite order, such as  $3 + 2 = 5$  and  $2 + 3 = 5$ .



## LESSON OUTCOME

Use pennies and nickels for amounts to 9 cents

### Materials








play store with various objects having tags showing prices from 1¢ to 9¢, real money, play money, or coin cutouts from copies of page T327

### Vocabulary

coin, penny, nickel, value, cent, price

## RELATED ACTIVITIES

• If you have no play store, make a store chart by cutting pictures from newspapers or catalogues and marking the items with suitable prices. Children may record their purchases on a chart.


| I buy  | I pay | I use   |
|--|-------|---|
|   | 7 ¢   |    |
|   |       |   |


- Challenge the children to find different ways of spending exactly 8¢ for patches shown on page 20.
- Children in your class or their older brothers and sisters may have coin collections. Some children may be interested in starting a penny collection. Indicate where the year of issue is found on the coin. Make a list of years starting from the present year and going back for several years to help the children recognize which years they do or do not have in their collections.


## LESSON ACTIVITY


### Before Using the Page

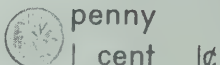
- Use real coins to discuss the penny and the nickel. Show that the value of each coin (1 cent, 5 cents) is indicated on one face. Discuss the fact that one nickel has the same value as five pennies. Discuss what the symbol ¢ stands for.
- Have the children practise counting on, for example, start at 5 and count on to 9. This activity helps the children to decide what coins other than a nickel they will need if the price tag shows more than 5¢.
- Encourage the children to use the terms *penny* and *cent* correctly. The name of the coin is *one penny* and the value of the coin is *one cent*. Display sets of pennies and nickels having values to 9 cents. Have children tell the value of each set of coins. Discuss ways of using different coins to show 5 cents, 6 cents, 7 cents, 8 cents, and 9 cents.
- Choose one child to be the storekeeper. Have other children use real or play money to buy one or two items, spending not more than 9 cents in all from one nickel and four pennies. (If children attempt to buy two items costing more than 9 cents





 1¢


 3¢


 4¢





 5¢





 2¢

 6¢







What coins do you need?



   





4 ¢









 

6 ¢



 






   

8 ¢






       

8 ¢

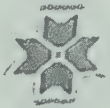
 



    

6 ¢

9 ¢



7 ¢

Draw the coins and show how much money is needed to buy each pair of items.

• 20 (twenty)

Using pennies and nickels, amounts to 9 cents

together, let them discover that they do not have enough money to do so.) The storekeeper must determine if the amount of money being given in payment is correct. Children should be allowed to use the play store in their free time.

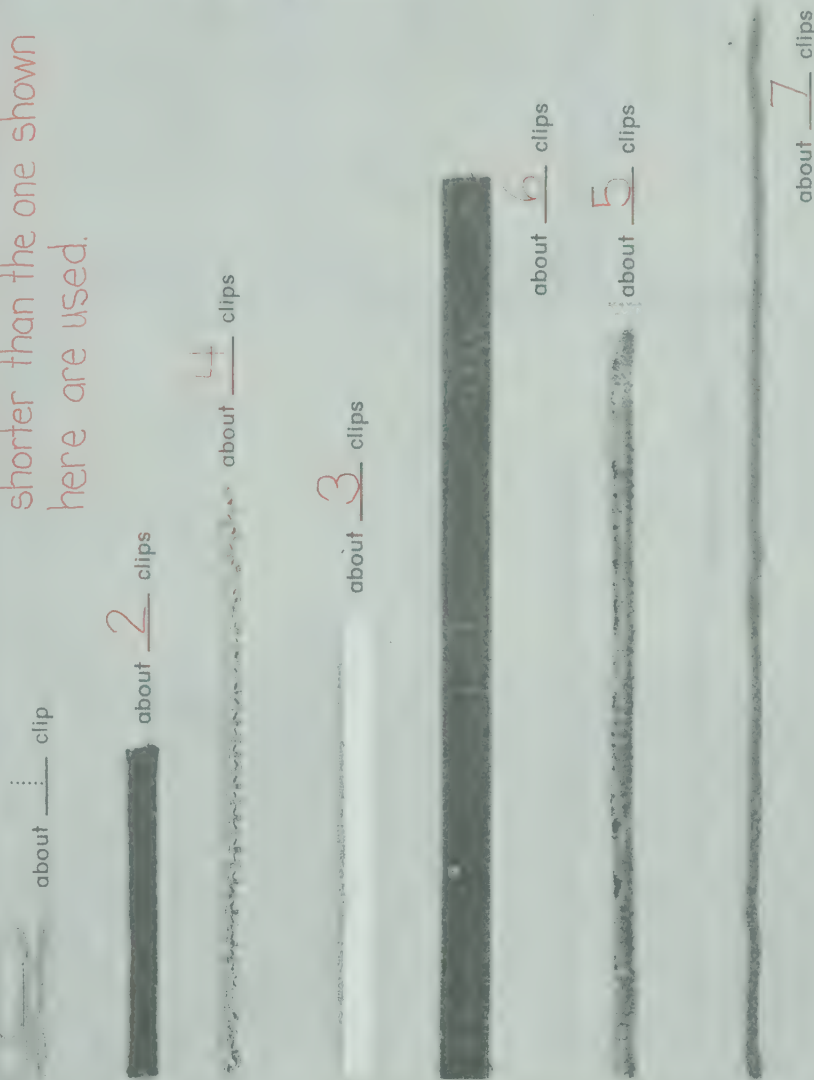
### Using the Page

- Ask children to state the price of each item at the top of the page. Have them identify the coins and read the words. Read the instruction and discuss the first exercise with the children. Ask how much the elephant patch costs and have the children trace over the first dotted penny. Ask how much the red patch costs and have the children trace over the three other dotted pennies. Ask how much money is needed in all and have the children trace over the dotted 4. You may prefer to give the children copies of page T327 and have them cut and paste appropriate coins for each exercise.

For assistance in completing the remaining exercises, you may wish to have the children print the price beside each patch. Keep in mind that the children are not required to write addition sentences to complete these exercises.

Use a paper clip.  
Measure the length of each object.

Answers will vary if paper clips shorter than the one shown here are used.



Measuring length using non-standard units

(Twenty-one) 21

## LESSON OUTCOME

Measure length using non-standard units

### Materials

objects to be used as non-standard units of length, paper clip for each child

### Vocabulary

measure, finger, hand, span, pace

## RELATED ACTIVITIES

- The more practice the children have in measuring with a paper clip, the better they will be at estimating lengths in relation to the length of the paper clip. Have the children use a paper clip to measure suitable objects in the classroom. They will naturally round off answers to the nearest paper clip. Encourage them to imagine first (estimate) how many paper clips would fit the length of the object. They may record their results on a chart.
- Children who have had little experience using non-standard units for measuring objects should be given a chance to do so now, using not only parts of the body, but also other objects such as a nail, an eraser, a pencil, or a piece of string. Select some of the objects to be measured and let the children select other objects.
- Children who have had experience with non-standard units of length may enjoy thinking of new units to use for measuring objects, for example, a drinking straw.

## LESSON ACTIVITY

### Before Using the Page

- Determine whether the children have had previous experience with non-standard units of measurement. If not, it will be necessary to introduce such units at this time. Have the children measure lengths using the finger, hand, span, or pace. Discuss how many fingers fit along their pencils. Ask them to use a hand to measure the length of a book and a span to measure an edge of their desk. Ask them what they might use to measure the length of the gym, and discuss why the pace is a better unit for this than the finger or the span.
- Measure the length of the chalkboard, using a span. Then have a child with a small span measure it. Discuss why the two answers are different. Have someone suggest what object in the classroom could be used so that everyone would get the same answer when measuring the length of the chalkboard. Choose an object, such as the chalkboard brush, and have several children measure the length of the chalkboard.

### Using the Page

- Give each child a paper clip for measuring the objects shown on the page. Ask the children to turn their books so that the objects will be in a horizontal position. Have the children place a paper clip over the one illustrated in the first exercise and make a mark at each end of the clip. Ask the children to note that the object is a bit longer than one paper clip. Have the children trace over the dotted 1 and read the measurement "about 1 clip". Let the children continue on their own, marking the end of the clip each time before they move the clip to a new position. In this way their measurements may be more accurate. Give children who have difficulty placing the paper clips and making the marks a number of clips to place end to end. While the children are working, check that they do not leave spaces between the ends of the paper clips.
- After the children have completed the page, ask questions involving comparisons, for example, "Which is longer, the gold chain or the blue pipe cleaner?" "Which is shorter, the green pipe cleaner or the red cord?"



## LESSON OUTCOME

Estimate length using non-standard units; measure to check an estimate of length

### Materials

objects to be used as non-standard units of length, paper clip for each child

### Vocabulary

estimate, measurement

## RELATED ACTIVITIES

- Prepare a chart to record results of other estimation activities using different non-standard units. Some may be done at home.

| Object | Unit | Estimate | Measurement |
|--------|------|----------|-------------|
| door   | span |          |             |

- Make up problem cards similar to the following for the children to use.

List five things that you think are less than 6 paper clips in length. Then measure.

Tell what you found.

## LESSON ACTIVITY

### Before Using the Page

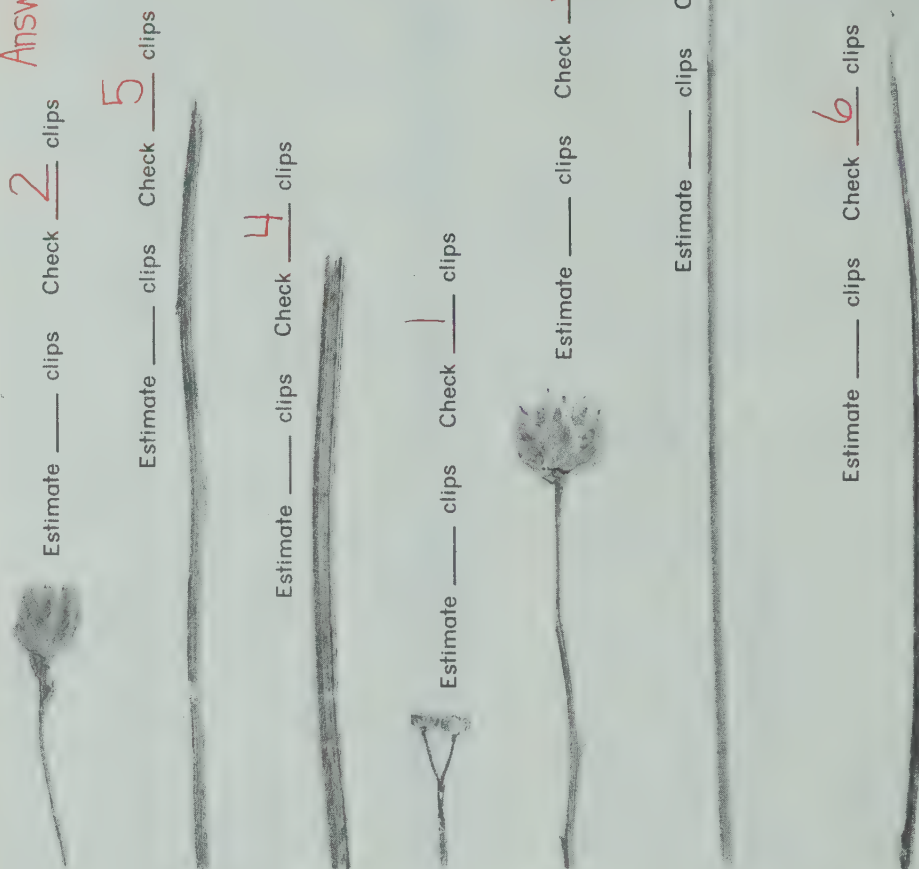
• The ability to estimate is an important step toward a real understanding of measurement. Estimating means that children must consider the distance to be measured and the unit to be used, and then visualize the number of those units in the distance. Thus, estimating depends on familiarity with the unit being used, and much practice should be given in measuring with that unit before any estimating is attempted. Through children's estimates, we learn whether or not they have an understanding of length and non-standard units.

The word *estimate* is correct in this instance. The word *guess* is often used, but this suggests a more haphazard process than the careful consideration that goes with estimation. Estimating is quite a challenging exercise for the brightest child, and even for some adults. Children with perceptual problems will have difficulty because they find things difficult to visualize.

Treat the concept of estimation not as a game but as something worthwhile. Few people can estimate the exact length, but

Estimate the length in paper clips.  
Check by measuring.

Answers will vary.



22 (twenty-two)

Estimating and measuring length using non-standard units

since we often wish to know only an approximate distance or length, we estimate. Do not expect children to estimate correctly, but be pleased if they are almost correct, because this shows a true understanding. Each estimate should be followed by a measurement so that the children can check their estimates and improve their ability to estimate.

Display an object and a paper clip. Have children estimate the length of the object in terms of the paper clip. Then have a child determine the actual length of the object by measuring it. In the time available, provide as much practice as possible in estimating and then measuring the lengths of different objects.

### Using the Page

- Read the instructions at the top of the page to the children. Have them turn their books so that the objects will be in a horizontal position. Ask children to estimate in paper clips the length of the first object. Then have the children complete all their estimates before you distribute the paper clips for checking the estimates. Accept estimates that are greater than or less than the measurement by one unit.

## OBJECTIVE

Demonstrate a knowledge of basic addition facts for sums to 9 and the concepts *is greater than* and *is less than*

## Materials

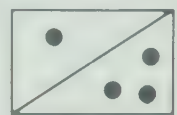
cards showing addition phrases for sums to 9, numeral cards for 0 to 9, hand puppet

## RELATED ACTIVITIES

- Have the children use counters and a sheet of paper marked into two parts as shown. If, for example, four counters are used, all the addition facts having a sum of four may be illustrated and the addition sentences recorded.



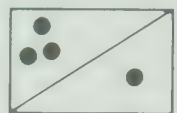
$$0 + 4 = 4$$



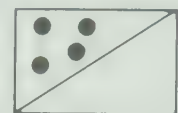
$$1 + 3 = 4$$



$$2 + 2 = 4$$



$$3 + 1 = 4$$



$$4 + 0 = 4$$

Write  $<$  or  $>$ .

$$2 + 6 > 3 + 4$$

$$3 + 1 < 8 + 1$$

$$7 + 1 > 5 + 1$$

$$2 + 7 > 4 + 2$$

$$5 + 4 > 1 + 7$$

$$4 + 4 > 2 + 2$$

$$0 + 6 < 3 + 4$$

$$1 + 2 < 5 + 2$$

Addition practice sums to 9

(twenty-three) 23

## LESSON ACTIVITY

## Before Using the Page

- Prepare cards showing addition phrases for sums to 9. Place numeral cards for 0 to 9 on the display board. Display an addition phrase, for example,  $2 + 1$ , and ask, "What number does this name?" A child who answers "three" may place the card below the appropriate numeral on the display board. Repeat the procedure for other addition phrases.
- Vary the preceding activity by asking children to state a name for a given number, say, eight. A child who says, "Six plus two", for example, places the corresponding card on the display board below the numeral card for 8.
- Display a numeral card and a card showing an addition phrase. Ask questions similar to the following: "Which is greater, (5) or (7)?" "Which is greater, (6) or  $(4 + 4)$ ?" "Which is less,  $(1 + 6)$  or  $(2 + 2)$ ?"
- Review the symbols  $>$  and  $<$  for "is greater than" and "is less than". Remind the children that each symbol always points to the lesser number. Use the hand puppet to review how each symbol always opens toward the greater number.

- Form number sentences using numeral cards and cards showing addition phrases, for example,  $4 + 2$  \_\_\_\_\_ 8. Have the children copy and complete the sentences by using the correct symbol,  $>$  or  $<$ . Have children read the completed sentences.

## Using the Page

- Direct the children's attention to the word "Match" at the top of the page. Then ask why the broken line joins  $3 + 3$  and 6. Have the children trace over the broken line. Similarly, ask why the broken line joins  $1 + 4$  and  $3 + 2$ , and have the children trace over it. Some children may prefer to print the numeral for the sum for each addition phrase before drawing the lines. When the children understand what they are to do, let them work independently.
- For the second part of the page, the children are to write the symbol  $>$  or  $<$  to make each statement true. Again, they may find it helpful to print the numeral for the sum for each addition phrase first.



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## Materials

flash cards for the words *after*, *before*, *between*, number line, numeral cards for 0 to 10 for display, numeral cards for 0 to 10 for each child, flash cards for addition in horizontal and vertical form, flash cards for the symbols  $>$  and  $<$

## RELATED ACTIVITIES

- Prepare domino cards showing an addition phrase on each half. Have the children match the dominoes end to end if the sums are equal.
- Children may play in pairs, taking turns rolling two dice marked 0, 1, 2, 4, 6, 8, and 0, 1, 3, 5, 7, 9. Have them tell which number is greater than (less than) the other, or whether the numbers are the same. If you wish the children to find the sum of the two numbers rolled, mark the dice 0, 1, 2, 3, 4, 5, and 0, 1, 2, 3, 4, 4 so that all the sums are less than 10.
- Have the children play the game "Lucky Nine" described on page T322.

Complete.

2 3 4 5 6 7 8 9

Ring the numbers that are greater than 4. (7) (9) 2 (8) 1

Ring the numbers that are less than 8. (6) 10 (3) (5) 9

Write  $<$  or  $>$ .

3  $<$  5      8  $>$  6      10  $>$  7

Match.

third fifth first second fourth eighth sixth seventh

Add.

$2 + 1 = \underline{3}$        $3 + 2 = \underline{5}$        $0 + 9 = \underline{9}$

$4 + 4 = \underline{8}$        $6 + 3 = \underline{9}$        $5 + 2 = \underline{7}$

$\begin{array}{r} 3 \\ +5 \\ \hline 8 \end{array}$        $\begin{array}{r} 2 \\ +7 \\ \hline 9 \end{array}$        $\begin{array}{r} 4 \\ +2 \\ \hline 6 \end{array}$        $\begin{array}{r} 0 \\ +7 \\ \hline 7 \end{array}$        $\begin{array}{r} 5 \\ +4 \\ \hline 9 \end{array}$        $\begin{array}{r} 6 \\ +3 \\ \hline 9 \end{array}$

How much?

8¢      7¢

24 (twenty-four) CHECKUP

## LESSON ACTIVITY

## Before Using the Page

- Review the concepts presented in Unit 1 by using some of the following activities. Draw a number line on the chalkboard and refer to it as often as possible.
1. Have the children count from 0 to 10. Then have them start at a given number that is less than 10 and count on to 10.
  2. Indicate a number on the number line. Have the children tell all the numbers that are greater (to 10) and then all the numbers that are less than the given number.
  3. Use the flash cards for the words *after*, *before*, and *between*. Display these with numeral cards and have the children use their own numeral cards to answer.
  4. Use flash cards showing addition in horizontal and vertical form. Have the children hold up their numeral cards to answer.
  5. Place two numeral cards against the chalkboard or on the display board. Have children place a card showing either  $>$  or  $<$  between the numeral cards to make a true statement. Ask the children to read each statement.

6. Review the ordinal number concepts *first* to *tenth* by using ten children or ten objects in a row and asking questions.
7. Review the terms *penny*, *one cent*, *nickel*, and *five cents*. Remind the children that an object costing *four cents* would be paid for with *four pennies*. Ask what the price of an item would be if you paid for it with one nickel and four pennies. Repeat for other examples.

## Using the Page

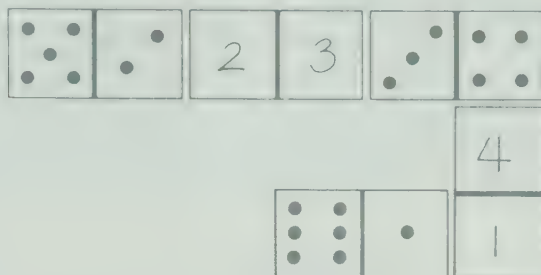
- Draw attention to the word *Checkup* at the bottom of the page. Tell the children that such pages throughout the book help them to check their understanding of the work they are learning. Read each instruction in turn or, where possible, have a child read it. Discuss how the children are to proceed on the page. The word "Match" implies that the children are to draw a line to connect the ordinal number word to the mouse that has that position in the row.

Observe the children as they work and give individual help to any child who is having difficulty.

## Games and Activities

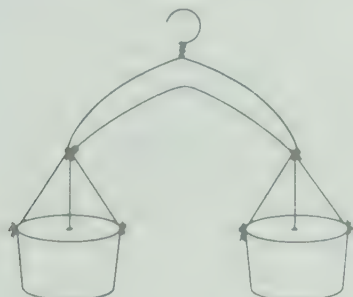
### Rules for the game on page T7

All the dominoes are placed face down. Each player draws the same number of dominoes, placing them on edge so that they are visible to no other player. The first player sets out a domino showing standard numerals. The second player must match this at one end with a domino showing dot patterns. If the domino does not match at either end, the player draws a domino from those that are face down. Other players continue by alternating the dot patterns and numerals. The player who uses all her/his dominoes first is the winner.



### Balance Scales (for page 6)

A wire coat hanger hanging freely from a hook may be used as balance scales. Use three strings to attach a plastic container from cottage cheese, for example, to each end of the coat hanger. The children may compare masses by putting an object in each of the containers.



### Comparison (Game for page 11)

#### Materials

two sets of numeral cards for 0 to 10  
a card showing  $>$  and one showing  $<$  for each player

#### Rules

1. Shuffle the cards and deal them face down into two piles, one pile for each player.
2. Each player turns over the card on the top of her/his pile.
3. The players take turns placing the symbol card showing  $>$  or  $<$  between the two numeral cards to make a statement.
4. If the statement is correct, the player claims both cards. If the statement is not correct, or if the numbers are the same, the cards are left on the table. The next player may place a new card on one of the two cards to make a statement. If the statement is correct, the player claims the three cards.
5. It is important that the two children sit side by side to play, not facing each other, so that they both see the symbol pointing in the same direction.
6. At the end of the game the player with the most cards is the winner.

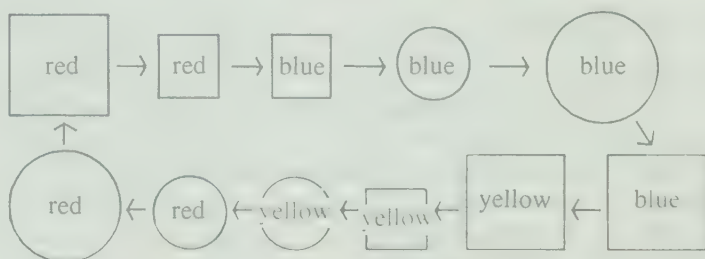
### Attribute Blocks (Games for page 13)

Knowing the names of the blocks is necessary for the following games.

- This game may be played first with one part of the set, for example, all the thin blocks, and later with the whole set. One child selects a mystery block, but does not remove it from the set. The child should, however, tell the teacher what it is or else make a quick sketch of it. The rest of the children ask questions to determine the attributes of the mystery block. For example, "Is it small?" "Is it blue?" "Is it a square shape?"

Questions such as "Is it this one?" (pointing to a block) will not bring satisfaction very quickly as to what the mystery block is, and children soon learn to sharpen their questioning skills.

- This game may be called "One Difference". Any two attribute blocks differ from each other in at least one way and at most four ways. One child puts down any block out of the set. Another child selects a block that is different from the first in only one way (color, shape, size, or thickness). The next player puts down a piece that differs from the second block in only one way. The blocks form a row that can be called a "one-difference train". The game continues in this way until all, or nearly all, the blocks in the set have been placed in the "train".



This game may be played for points. A point is gained by correctly placing a block according to the rules or by challenging another player who has placed a block incorrectly. A point is lost by incorrectly placing a block or by incorrectly challenging another player about a block.

- Change the game "One Difference" to a game of two, three, or four differences. Two differences provide more choices than one difference.
- Change the "Difference" games by placing the blocks in a circle rather than in a row. When a player discovers a block that will fit at either end, he/she may end the game by completing the circle. To do this for one difference, for example, the player must find a piece that is different in one way from the last one placed, and also different in one way from the first block placed.

### Activity for page 18

Put part of a simple word on a card and the remaining part of the word on another card. On the other side of each of the two cards print a numeral. On a third card, print the complete word on one side and the sum of the two numbers on the other side. The children may work alone, in pairs, or in groups to find the three cards that go together.

|    |    |      |                        |
|----|----|------|------------------------|
| pl | ay | play | (on one side)          |
| 2  | 3  | 5    | (on the opposite side) |



## Unit 2 Overview

In this unit the operation of subtraction is reviewed for subtraction facts having minuends to 9. Illustrations of sets of objects are provided to represent the removal (separation) concept of subtraction. Number lines showing subtraction as movement to the left provide an informal look at the inverse relationship between addition and subtraction. Practice exercises in subtraction occur throughout the unit and other exercises are included to review and reinforce the work in addition. Some of these exercises require children to complete a number sentence by writing the missing second addend for a given sum of 10 or less. Sums of three addends are determined and children discover that the grouping of addends does not affect their sum. Number concepts 10 to 20 are reviewed and children complete exercises in ordering these numbers. Non-standard units are used for estimating and measuring capacity and mass. Four geometric shapes—circle, rectangle, square, and triangle—are reviewed and from sets of these shapes children select those that are identical. The *Checkup* at the end of the unit provides for evaluation of most of the concepts and skills in the unit, with the exception of measurement, for which the teacher's observation of children handling measuring devices is better suited.

### Unit Outcomes

#### Number

- write number sentences to show subtraction, minuends to 9
- complete subtraction sentences for minuends to 9
- use the number line for subtraction, minuends to 9
- use the vertical form for subtraction
- add and subtract amounts of money, to 9 cents
- order the numbers from 10 to 20
- identify numbers greater than or less than the numbers to 20
- complete basic subtraction facts, minuends to 9
- complete addition sentences for sums of 10
- write an addition sentence that describes an additive situation
- recognize different names for the same number
- determine the missing second addend in an addition sentence, sums to 10
- determine the missing second addend in the name for a number to 10
- recognize that the grouping of addends does not affect the sum
- complete basic addition and subtraction facts, sums to 10 and minuends to 9

#### Measurement

- measure the capacity of a container using a non-standard unit
- estimate the capacity of a container using a non-standard unit; measure to check an estimate of capacity
- measure the mass of an object using a non-standard unit
- estimate the mass of an object using a non-standard unit; measure to check an estimate of mass

#### Geometry

- recognize basic geometric shapes
- recognize identical geometric shapes

#### Background

**Number:** In this unit, subtraction is limited to the one use that may be described as “removal” or “separation”, since this

approach is found to be the easiest and most common in children's experiences. They can use sets of objects and remove or separate members to rediscover or illustrate the basic subtraction facts. Such an activity reveals the two related facts at the same time. For instance, if a set of seven objects is separated into a group of two and a group of five, both  $7 - 2 = 5$  and  $7 - 5 = 2$  can be derived. Although this situation also generates two addition facts, no attempt is made at this time to relate the operations of addition and subtraction. This relationship is explored in Unit 3.

The four basic operations (addition, subtraction, multiplication, division) are known as *binary operations* because only two numbers can be combined at one time. If there are more numbers, as in column addition, the operation is performed on one pair of numbers and the result is then combined with the next number. The order of grouping addends when there are more than two does not affect their sum. This is the *associative property of addition*. Because of this property, addition of more than two addends can be checked by grouping different pairs of numbers.

$$(3 + 2) + 4 = 5 + 4 \\ = 9$$

$$3 + (2 + 4) = 3 + 6 \\ = 9$$

**Measurement:** Since containers come in a variety of shapes and sizes, children probably experience more difficulty estimating and measuring capacity than they do in estimating and measuring length. To develop the ability to estimate capacity, children need many experiences in pouring from a large container into smaller containers, and filling large containers using a smaller container as a non-standard unit of capacity. If the results are carefully recorded, the children may be provided with an informal insight into the concepts of ratio and rate. For instance, if one soup can holds as much as four baby-food jars, their capacities have a ratio of four to one. From this scale, it is relatively easy to determine how many jars would be required to fill two, three, or more, soup cans.

In this unit, larger masses are measured in terms of smaller non-standard units of mass, for example, pennies. The number of pennies required to balance an object establishes a ratio between the object and the unit of mass in the same manner as described above regarding capacity. From the ratio obtained, the mass of several identical large masses can be calculated without actually balancing them. You may wish to provide this extension of the topic for some children.

**Geometry:** Four two-dimensional shapes are reviewed in this unit—circle, rectangle, square, and triangle. Since the work involves recognition of the shapes, the number of sides and the number of corners (vertices) should be emphasized in connection with their names. Some children may be interested in noting that the number of sides of a polygon is always the same as the number of vertices. The children can be made aware that not all four-sided polygons are called rectangles, only those with four square corners; and that not all rectangles are squares, only those with four equal sides. The second preliminary activity described on page T53 demonstrates that the name of the shape refers to the boundary, not the interior region.

## Teaching Strategies

For many children some of the concepts and skills in this unit will not be new. Basic subtraction facts having minuends to 9 are reviewed and you will have an opportunity to note the individual weaknesses as the children complete the exercises. Once again, pairs of facts are emphasized wherever possible, providing an opportunity for children to master the two facts equally well.

It is stated earlier in the overview that the "removal" type of subtraction is used in this unit. Actually, the removing or taking away can occur only with sets of objects, whereas the subtraction is performed with the numbers. For this reason, try to use the correct terms when describing either the physical actions or the abstract relationships. For example, "Nine pears *take away* three pears leaves six pears" refers to the objects; "Nine *minus* (or *subtract*) three equals six" refers to the numbers in the subtraction sentence  $9 - 3 = 6$ . The use of objects in reviewing the operation of subtraction as a separating action will be helpful in preparing the children for subsequent work in solving word problems.

Before showing subtraction on the number line it would be advisable to review the direction of the arrows for showing addition, particularly the second arrow; since, for subtraction, it is the second arrow that points in the opposite direction to represent the number being subtracted.

A walk-on number line on the floor can provide the children with experiences that lead to a firm understanding of the effect of subtraction. At the same time the children acquire some appreciation of the inverse relationship between the operations of addition and subtraction.

On page 42 the children meet the associative (grouping) property of addition by which the sum of more than two numbers is the same regardless of the order in which the addends are grouped. The children need not know the name of the property, but they can discover and appreciate its value in checking addition. Sets of objects are recommended so that the children can actually group the sets in different ways. Also, the sets may be placed both horizontally and vertically to correspond with the addends written in both forms.

In *Teaching Strategies* for Unit 1 it is suggested that each child have an envelope of materials for her/his own use. For the lessons in Unit 2, numeral cards and number word cards for 11 to 20 and cutouts of geometric shapes with their names on one side should be included.

Special materials and facilities will be required for the activities of measuring and estimating capacity and mass. You will need to decide whether to assign the activities for completion in days or weeks, since a limited supply of materials will necessitate small work groups. If sufficient materials are available to ensure that all the children can have direct experiences in measuring and estimating, you may prefer to keep the entire class together for these topics. After this basic decision is made, involve the children in planning how they can carry out the activities in the most effective way. Children who share in the planning assume more of a commitment to carry out the work accordingly, and thereby grow in their ability to discipline and govern themselves.

For measuring capacity and mass, encourage the children to bring objects from home, for example, jars, bottles, juice cans, milk cartons, ice-cream tubs, old keys, buttons, washers, and so on.

## Materials

display board and cutouts, chart paper  
twenty counters for each child  
cutouts of apples and apple cores  
demonstration number line with matching strips for 1 to 9  
real money, play money, or coin cutouts from copies of page T327  
play store or store chart, chart for recording transactions  
cards for each child to make numeral cards for 11 to 20  
ten cards (20 cm by 30 cm each) showing the numerals 11 to 20  
flash cards showing *after*, *before*, *between*, *greater than*, *less than*, *one greater than*, *one less than*  
flash cards for the number names *eleven* to *twenty*  
objects for grouping by tens (optional)  
subtraction phrases on cards  
a number line for each child  
overhead projector (optional)  
containers of various sizes for measuring capacity, including those shown on pages 33 and 34  
materials for filling containers (sand, water, peas, beans, rice)  
instruments for filling containers (spoons, scoops, funnels)  
number board and tags (See page T322.)  
attribute blocks or other colored blocks, colored beads, Unifix cubes, three small boxes  
balance scales, small objects for which the masses are to be determined, including those shown on pages 37 and 38  
non-standard units of mass including 20 pennies  
charts showing circles, rectangles, squares, and triangles  
pieces of string 30 cm long  
square, circular, triangular, and rectangular shapes of different sizes and other irregular shapes

## Vocabulary

|                      |                          |
|----------------------|--------------------------|
| eleven               | circle                   |
| twelve               | rectangle                |
| thirteen             | square                   |
| fourteen             | triangle                 |
| fifteen              | sides                    |
| sixteen              | identical (optional)     |
| seventeen            | diamond (optional)       |
| eighteen             | parallelogram (optional) |
| nineteen             | container                |
| twenty               | holds more               |
| take away            | holds less               |
| minus                | fill                     |
| subtraction sentence | pour                     |
| subtract             | empty                    |
| addition phrase      | heaviest                 |
| subtraction phrase   | lightest                 |
| place holder         |                          |



## Unit 2 Theme –Harvest

The purpose of this theme is to enable the children to appreciate the qualities unique to harvest time. There are colors, textures, and smells special to this time of year. It is hoped that the children will experience new foods and their characteristic tastes. Through such experiences the children may come to realize the effects of the environment on their personal lives.

Create a background of autumn pictures and photographs that illustrate the activities, products, and beauty of this season. Place samples of autumn produce on a table. Display books that deal with seasonal change, food, and Halloween. Include the children's work from the suggested activities.

### LANGUAGE ACTIVITIES

#### 1. Ideas About Harvest

Introduce the word *harvest* and discuss with the children their ideas of what the word means. Suggest the idea that *to harvest* means "to reap" or "to gather". Make a list of the things the children can think of that are gathered at harvest time.

Make a "Sense Chart" with columns labelled "Touch", "Taste", "Sight", "Sound", and "Smell". Have the children suggest words that harvest brings to mind for each column. Divide the class into five groups. Have the children in each group illustrate one column from the "Sense Chart". Use these illustrations to make a class book for the harvest display. Encourage the children to choose a title for the book.

#### 2. A Harvest Visit

If possible, visit a farm that has field crops and a vegetable garden. Help the children to identify the various grains, fruits, and vegetables. Encourage them to feel the surfaces of various items and, where possible, taste things that may be new to them.

A market of garden produce will also illustrate the bounty of the autumn season. Arrange to visit when the operators are least busy. Again, have the children use their senses as they investigate the different items.

A local supermarket can also provide learning situations about autumn produce. Arrange for the produce manager to tell the children about the different fruits and vegetables. In this situation it is important to distinguish between local products and imported items.

After the visit to the local supermarket or farm, include new words on the "Sense Chart". Use a different color for the new words. Discuss whether any ideas have changed since the visit. Also discuss the new words that have been included and which of the five columns contains the greatest number of words.

#### 3. Harvest Poems

Use the words from the "Sense Chart" to create poems about the harvest season. Try various combinations of words. Select one word from each column and arrange them in a pleasing rhythm. Use four words from one column and arrange them in a rhythmic pattern.

Read the poems in a variety of ways, changing the rhythm, tone, or pitch.

Select something that is a symbol of harvest time, such as a pumpkin. Have the children suggest words that describe the pumpkin. Try to arrange these words to create a poem.

The children may create poems of their own by choosing a group of words and arranging them in a pleasing pattern. The poems may be illustrated and collected in a book for the harvest display.

#### 4. Harvest Riddles

Make a list of all the items that the children associate with harvest. Have the children make up simple riddles about some of the items, for example, "What is red and round and crunchy?"

Have each child print a riddle on a card. Each answer may be illustrated and then covered with a flap having the outline of a leaf. Players may guess the answer to a riddle and then check by peeking under the leaf. Include these riddle cards in the harvest display.

#### 5. Harvest Alphabet

Refer to the list of items prepared for Activity 4. Make a book containing a page for each letter of the alphabet. Record the appropriate words on each page. Discuss which page has the greatest number of words and which pages do not have any words. Include other words as the children become aware of more fruits and vegetables.

### MATHEMATICS ACTIVITIES

#### 1. Harvest Store

This is an excellent time to begin a play store in the classroom. The children may bring empty food containers from home to stock the store. Include harvest items that have a long life, such as apples, squash, and nuts. Prepare price tags for the items and, if possible, use real money for transactions. The children may take turns being the storekeeper. Have the storekeeper record the transactions so that they can be checked for accuracy.

#### 2. Comparing Masses

Select six items of produce having different masses, for example, a nut, an apple, a squash, a pear, a turnip, and a cabbage.

Place the items in pairs, for example, the apple and the nut. Have several children estimate which item in each pair is the heavier one. Check the estimates by using balance scales. Record the estimates and the measurements. Repeat the procedure for other pairs of items.

Place the six items in order from lightest to heaviest. Ask the children how the estimates can be checked. If they have difficulty with this concept, refer to page 37 in Unit 2. Have the children illustrate the correct order of the six items.

#### 3. Recognizing Shapes

Use either samples of real fruits and vegetables or brightly colored pictures for this activity. Show different shapes such as cylinders, spheres, and cubes. Have the children sort the fruits and vegetables according to the geometric shape suggested by each. Ask questions similar to the following:

"Which shape occurs most often?"

"Which shape occurs least often?"

"Which items were difficult to classify?"

"Which items grow in different shapes?"

"Which items suggest a combination of two shapes?"

#### 4. Graphing

Prepare the headings "Cylinder", "Sphere", "Cube", and so on, for a horizontal bar graph. Consider each fruit and vegetable discussed in Activity 3 and color inside a square of the appropriate bar. Have the children answer questions based on the information shown by the graph.

#### 5. Vegetable Survey

Have the children refer to the list of vegetables in Activity 3. Ask them to decide which vegetable is their favorite for dinner and which vegetable they dislike the most. In order not to have the children's decisions influenced by those of other members of the class, give each child a small piece of paper on which he/she is to indicate his/her favorite vegetable on one side and the vegetable most disliked on the other side. Ensure that the children code each side of the paper with "L" for "Like" and "D" for "Dislike".

Ask children to collect the papers and sort them first for all the vegetables that are liked. List the names of the vegetables on the chalkboard and as a vegetable is mentioned mark a tally beside its name. Follow a similar procedure for a list of the vegetables disliked.

Have the children determine the favorite vegetable(s) and the vegetable(s) disliked most. Help the children to make other discoveries about the results shown in the tally charts; for example, the results may indicate that more children like roots better than they like green leafy vegetables.

### SCIENCE ACTIVITIES

Some fruits have a variety of uses. Two of these are the apple and the pumpkin.

#### 1. The Apple

Choose three different kinds of apples. Cut each variety of apple into bite-size pieces for the children to taste. Discuss how the apples differ in size, shape, color, texture, and taste. If possible, introduce other varieties of apples and compare their characteristics.

On a map of Canada, locate the origin of each of the varieties so that the children will be aware that apples come from all parts of Canada.

Tell the children the story of Johnny Appleseed. This is a suitable story to illustrate on a mural with trees and figures sculptured from paper.

The apple is probably most popular raw as a snack or dessert. Discuss with the children why it is often called "Nature's toothbrush". Introduce the nutritional value of the apple and compare this with the nutritional values of other favorite snacks. Discuss which snacks are best for one's teeth and body. Discuss the old adage: "An apple a day keeps the doctor away." Ask why this saying might be true.

Apples are processed in many ways. Collect containers or pictures of apple products and put these on a chart or in a booklet. Encourage the children to find at least fifteen different products.

Sample some of the apple products in class. Applesauce, apple cobbler, apple crisp, apple pie, and baked apples are all easy to prepare for the children to have a harvest treat.

Apples are sometimes used for arts and crafts. An apple stuck with cloves and tied with a ribbon makes a scented pomander for a clothes closet. Peeled whole apples may be allowed to dry and

shrivel. These form the heads for apple dolls. Show an apple doll to the class. Discuss the skills that are necessary to make an apple doll. Ask the children to suggest how this very old craft may have been discovered.

#### 2. The Pumpkin

Ask the children what a pumpkin brings to mind. Undoubtedly, they will think of Halloween. Discuss why they think the pumpkin is associated with Halloween.

Read some stories or poems about pumpkins, for example,

##### THE PUMPKIN

I'm a pumpkin round and yellow.  
Such a very saucy fellow.  
Every day I heave a sigh.  
Will I become a pumpkin pie?

*Unknown*

The pumpkin is an interesting fruit in that the shell, the pulp, and the seeds can all be used.

##### *Making a Jack-o'-lantern*

Obtain a firm, ripe pumpkin. Use a magic marker or a pencil to mark a face on the pumpkin. Cut off a "cover" and remove the seeds. Wash and save the seeds for the next activity. Cut out the face. You may have to begin the cutting to protect the children from injury. Help the children write a Halloween poem about the Jack-o'-lantern.

##### *Toasting Pumpkin Seeds*

Coat the clean, dry pumpkin seeds lightly with oil and salt. Toast these in a warm oven for about an hour. Have the children record the recipe and describe their own reactions to the taste.

##### *Growing a Pumpkin Vine*

A pumpkin vine will add greenery to your classroom throughout the winter months. Soak some seeds overnight to hasten germination. Plant the seeds about two centimetres deep in a pot and keep the soil moist. In about three weeks a leafy green shoot will appear through the soil. Place the pot on a sunny window sill and enjoy a touch of spring.

##### *Tasting a Pumpkin*

Peel the pumpkin pulp and cut it into small pieces. Simmer this pulp for about half an hour until it is tender, then drain and mash it. You may wish to make a pumpkin pie, pumpkin custard, pumpkin muffins, or pumpkin bread. The results of your cooking experiences will be a good excuse to have a pumpkin party.

### SOCIAL STUDIES ACTIVITIES

#### 1. Changing Seasons

As summer passes and we look forward to winter, many changes take place in our environment that cause us to adapt or to change our ways of living.

To help make the children aware of the effects of the environment on our lives, prepare a chart with two columns labelled "Changes Around Us" and "Changes We Make in Our Lives". As information is gathered, record it on the chart. The children will easily see that one change in the environment will affect us in several ways. The chart may show the following information:



| Changes Around Us                                   | Changes We Make in Our Lives   |
|---|--|
| The temperature becomes colder.                     | <ol style="list-style-type: none"> <li>1. We wear warmer clothes.</li> <li>2. Plants die and we prepare food by canning, drying, or freezing.</li> <li>3. Summer toys and equipment are put away.</li> <li>4. Storm windows are put on a house.</li> </ol> |
| The weather becomes windy, cloudy, rainy, or snowy. | <ol style="list-style-type: none"> <li>1. We can't play outdoors as often.</li> <li>2. We must wear special clothes — raincoats, boots, mittens, hoods.</li> </ol>   |
| The days become shorter.                            | <ol style="list-style-type: none"> <li>1. We can't play outdoors as long after school.</li> <li>2. The lights are turned on earlier in the evenings and left on later in the mornings.</li> </ol>  |

## 2. Clothing for Different Seasons

Make a chart showing three columns with the headings "Summer", "Autumn", and "Winter". Have the children find pictures in newspapers, magazines, or catalogues to illustrate clothing that is distinctive to each season. Discuss the differences in the three types of clothing.

## 3. Food for Winter

Explain the processes of canning, cold storage, drying, freezing, and pickling. List foods that are preserved by each method. Discuss which foods are preserved by more than one process.

Have the children taste a food that can be stored in several ways; for example, green beans are available fresh, canned, or frozen. Discuss which form has the best taste, texture, and appearance. Try the test with other foods such as carrots, peas, peaches, or tomatoes. Discuss whether the results are the same as before.

## 4. Hours of Daylight

Keep a record for about one month of the time it becomes dark each evening. Determine whether the hours of daylight are noticeably shorter over this period of time.

## ART ACTIVITIES

### 1. Seed Collage

A feed supply store is an excellent source for seeds such as oats, corn, wheat, barley, and peas.

Have the children use white glue to make the outline of an animal, a building, or some other object on thin cardboard. They may place one kind of seeds on the outline and fill in the spaces with other kinds of seeds to make a picture or a design.

### 2. Vegetable Animals

Collect some fresh vegetables from a nearby farm or a market garden. Some suitable vegetables will be potatoes, carrots, celery, cucumbers, dried beans, onions, and ears of corn.

Present the selection of vegetables to the children together with toothpicks and knives for cutting the vegetables. Have the children create interesting and amusing vegetable animals. For example, to a cucumber body, carrot legs could be attached with toothpicks. A potato could be used as the head with bean features and curled celery strips for ears. A green onion stalk would make a suitable tail. The children need be limited only by their imaginations.

## MOVEMENT ACTIVITIES

### 1. Falling Movements

Another name for the harvest season is "fall". Have the children think of various things that fall at this time of the year, for example, nuts, leaves, and apples. Read the following poem to the children and have them do the actions suggested.

#### LITTLE LEAVES

Little leaves fall gently down,  
Red and yellow, orange and brown;  
(Raise hands and lower them, fluttering  
fingers like falling leaves)

Whirling, whirling round and round,  
(Repeat finger fluttering while spinning  
around)

Quietly without a sound;  
Falling softly to the ground,  
(Lower bodies gradually to floor)

Down — and down — and down — and down!

### 2. Harvest Actions

Have the children suggest action words associated with the harvesting of crops, for example, carrying, chopping, cutting, husking, picking, and pulling. Make appropriate motions to demonstrate the harvesting of a particular crop, for example, pulling ears of corn off the stalks and husking them. Have the children identify the motions demonstrated. Then have small groups of children, in turn, dramatize the motions required for harvesting other autumn crops. Encourage the remaining children to interpret the motions being demonstrated and then guess what crop is being "harvested".

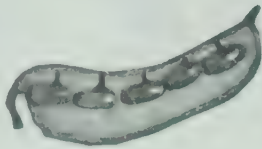
## MUSIC ACTIVITIES

### 1. Harvest Music

Identify the activities that are unique to harvest time, such as picking apples, flying kites, or cutting pumpkins. Find pieces of music that suggest these activities. Play them for the children and discuss the activities involved.

## Unit 2

Complete.



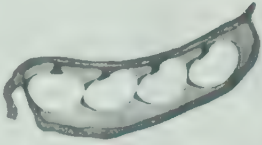
5



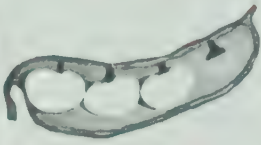
$$5 - 3 = 2$$



$$5 - 2 = 3$$



4



$$4 - 1 = 3$$



$$4 - 3 = 1$$



6



$$6 - 1 = 5$$



$$6 - 5 = 1$$



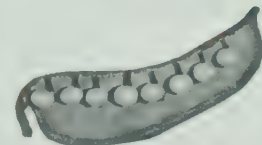
7



$$7 - 4 = 3$$



$$7 - 3 = 4$$



8



$$8 - 5 = 3$$



$$8 - 5 = 3$$

Writing subtraction sentences, minuends to 9

(twenty-five) 25

## LESSON OUTCOME

Write number sentences to show subtraction, minuends to 9

## Materials

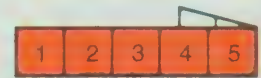
display board and cutouts, nine counters for each child, cutouts of apples and apple cores

## Vocabulary

take away, minus, subtraction sentence

## RELATED ACTIVITIES

- Have the children use number strips to illustrate subtraction. For  $7 - 2$  use a seven-strip and indicate the taking away of two squares by either of the following procedures.
  1. Bend back the squares for 6 and 7.
  2. Invert a two-strip to cover the squares for 6 and 7.



- Counting backward is appropriate at this time. Start with nine counters. Take away one counter at a time. Have the children tell how many are left each time until there are zero counters left. Have the children start at nine and rote count backward to zero.

## LESSON ACTIVITY

## Before Using the Page

- Have seven children form a circle or stand inside a ring on the floor. Ask how many children there are. Ask four children to leave the group. Ask how many children went away and how many are left. Say, "Seven children *take away* four children leaves three children." Repeat for other pairs of numbers.
- Place nine cutouts on the display board. Have a child remove four of them. Ask how many cutouts are left. Write "9 shapes *take away* 4 shapes leaves 5 shapes" on the chalkboard. Ask the children if they can suggest a number sentence to tell the story. Write the *subtraction sentence*  $9 - 4 = 5$  on the chalkboard. Have children read it as "Nine minus four equals five." Repeat for other pairs of numbers.
- Have the children use their counters. Ask them to make a set of five counters. Write "5" on the chalkboard. Ask them to take away two counters. Write " - 2" to the right of the 5. Ask how many counters are left. Write " = 3" to complete the subtraction sentence. Have children read the subtraction sentence ( $5 - 2 = 3$ ). Repeat for other sets.

- Display five cutouts of apples. Then, while the children have their eyes closed, replace two of the apples with two cutouts of apple cores. Have the children determine the subtraction sentence that tells how many apples there were, how many apples were eaten, and how many apples are left. For the next example, replace three apple cutouts with three cutouts of apple cores and ask the appropriate questions.

## Using the Page

- Discuss the first exercise with the children. Ask how many beans are shown in the first pod. Then ask how many beans were removed from the second pod and how many beans are left in the second pod. Have the children trace over the dotted 3 and the dotted 2. Ask a child to read the subtraction sentence. Repeat the procedure for the third pod. When the children understand how to interpret the pictures, let them work independently.

After the children have completed the page, have them study the pairs of subtraction sentences. Ask children in turn to interpret the three pictures in each row and to read the completed subtraction sentences.



## LESSON OUTCOME

Complete subtraction sentences for minuends to 9

### Materials

cutouts of apples and apple cores

## RELATED ACTIVITIES

- Prepare work sheets for subtraction facts with minuends of 9, 8, and so on. Some children may still need to use counters.

|   |   |   |   |   |
|---|---|---|---|---|
| — | 0 | 1 | 2 | 3 |
| 9 |   |   |   |   |

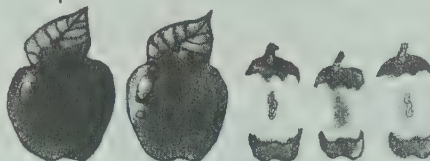
|   |   |
|---|---|
| 8 | 9 |
|   |   |

- Prepare activity cards or work sheets on which the children can cross out members of a set to show how many have been taken away. Have the children write the corresponding subtraction sentences for given sets.

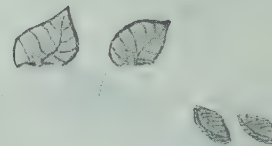
You may wish to adapt this activity for children to work in groups of three, changing roles from time to time. The first child draws a set of objects, the second child crosses out some members, and the third child writes the subtraction sentence.

- Discuss the different fruits shown on the page. Ask children to name their favorite fruit of the ones shown. You may wish to prepare a horizontal bar graph showing the number of children who chose each kind of fruit as their favorite.

Complete the number sentences.



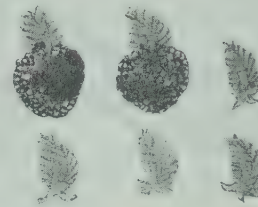
$$5 - 3 = 2$$



$$4 - 2 = 2$$



$$8 - 5 = 3$$



$$6 - 4 = 2$$



$$3 - 2 = 1$$

$$5 - 2 = 3$$

$$7 - 5 = 2$$

$$6 - 3 = 3$$

$$9 - 3 = 6$$

$$8 - 4 = 4$$

$$7 - 2 = 5$$

$$8 - 1 = 7$$

$$3 - 3 = 0$$

$$8 - 6 = 2$$

$$6 - 2 = 4$$

$$9 - 5 = 4$$

$$4 - 4 = 0$$

$$9 - 6 = 3$$

$$8 - 2 = 6$$

$$6 - 5 = 1$$

$$7 - 3 = 4$$

$$9 - 7 = 2$$

$$2 - 0 = 2$$

$$4 - 0 = 4$$

$$4 - 1 = 3$$

$$9 - 4 = 5$$

$$8 - 3 = 5$$

$$7 - 4 = 3$$

26 (twenty-six)

Completing subtraction sentences, minuends to 9

## LESSON ACTIVITY

### Before Using the Page

- If children are not familiar with the method of crossing out members of a set to indicate how many are being taken away, demonstrate it now. Draw six oranges on the chalkboard and tell this story: "I had six oranges. I ate two of them. How many are left?" As you say this, mark X's on two of the oranges. Then ask how many oranges are left and write the subtraction sentence ( $6 - 2 = 4$ ).

Ask a child to tell a simple story. Have other children help to draw the set to illustrate the story and write the subtraction sentence. This activity is a review of subtraction. It also provides incidental practice for later work with word problems.

- Use the cutouts of apples and apple cores suggested in *Before Using the Page* on page T35. Begin by illustrating  $5 - 1$  and continue with other examples. Remember to replace five apples with five apple cores, and five apples with zero apple cores to illustrate  $5 - 5 = 0$  and  $5 - 0 = 5$ .

- Draw illustrations for subtractive situations similar to those on page 26. Have the children determine the corresponding subtraction sentences.

### Using the Page

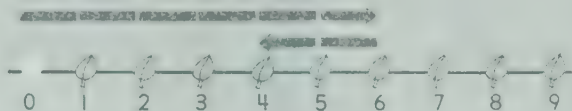
- Read the instruction with the children. For the first exercise ask what the 5 indicates, what the 3 indicates, and what the 2 indicates. Have the children trace over the three dotted numerals. Ask a child to read the subtraction sentence. For the second exercise, ask how many plums there were before any were eaten, how many plums were eaten, and how many plums are left. Have the children write the appropriate numerals in the blanks. Then let the children work independently.

Children who need help in completing the three columns of subtraction sentences may use the nine oranges as counters.

- After the children have completed the page, you may wish to present word problems in the following way: "Read the subtraction sentence in the third column that describes this story: Sue had eight plums. She ate two of them. How many plums were left?"

Complete.

$$6 - 2 = \underline{4}$$



$$3 - 1 = \underline{2}$$



$$5 - 2 = \underline{3}$$



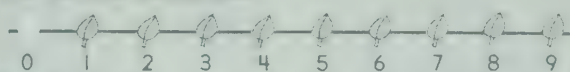
$$8 - 5 = \underline{3}$$



$$7 - 3 = \underline{4}$$



Complete the number sentences.



$$4 - 1 = \underline{3}$$

$$5 - 4 = \underline{1}$$

$$7 - 2 = \underline{5}$$

$$6 - 3 = \underline{3}$$

$$7 - 5 = \underline{2}$$

$$9 - 4 = \underline{5}$$

$$4 - 0 = \underline{4}$$

$$8 - 4 = \underline{4}$$

$$8 - 3 = \underline{5}$$

$$5 - 5 = \underline{0}$$

$$9 - 5 = \underline{4}$$

$$9 - 6 = \underline{3}$$

$$6 - 4 = \underline{2}$$

$$7 - 4 = \underline{3}$$

$$8 - 1 = \underline{7}$$

Using the number line for subtraction, minuends to 9

(twenty-seven) 27

## LESSON OUTCOME

Use the number line for subtraction, minuends to 9

## Materials

number line with matching number strips for 1 to 9

## RELATED ACTIVITIES

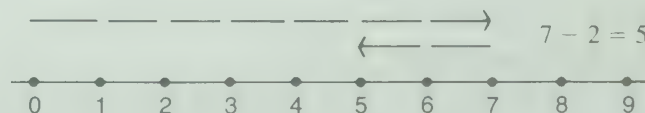
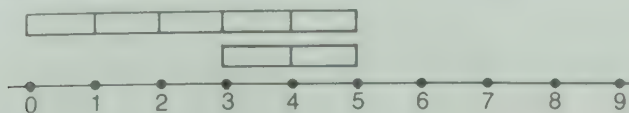
- Some children may benefit by demonstrating addition and subtraction using a number line on the floor. Use flash cards, each card showing an addition or a subtraction phrase on one side and the answer on the reverse side. Have each child select a card and use the number line to find the sum or the difference. To demonstrate  $6 + 2$ , for example, a child would stand at 0 on the number line, take six steps forward, pause, and then take two more steps forward. For  $7 - 5$ , for example, a child would stand at 0, take seven steps forward, pause, and then walk back 5 steps. The child can look down, say what number he/she has reached, and then check the number with the answer shown on the reverse side of the card.

## LESSON ACTIVITY

### Before Using the Page

- Use a number line with matching number strips for 1 to 9 to review addition. Ask children to hold the appropriate strips for  $5 + 2$  along the number line. Ask how the sum, 7, is shown. Have a child write the addition sentence on the chalkboard.

Write  $5 - 2 = \underline{\quad}$  on the chalkboard and have the children use their counters, if necessary, to find the result (3). Then ask the children to suggest how this subtraction fact can be shown on the number line. Help the children by suggesting that because the first number is 5, they should start by holding the five-strip above the number line. Ask where the two-strip should be placed to indicate the result (3). (Note that the two-strip is held *below* the five-strip as shown.) Repeat the procedure for other subtraction facts. Then use a number line on the chalkboard to show how arrows are drawn to indicate subtraction.



### Using the Page

- Discuss the first exercise with the children. Note that the first number is 6 and the second number is 2. Have the children use a finger to trace the arrows on the number line. Emphasize that the second arrow points to the left because the second number is being subtracted from the first number. Ask how the number line shows the result for  $6 - 2$ . Have the children trace over the dotted 4 in the subtraction sentence and then continue on their own. Point out that they are required to draw the arrows for the last three number lines.
- For the second part of the page, the children may use a finger to show the moves on the number line to help in completing the subtraction sentences. Pay particular attention to the two exercises  $4 - 0 = \underline{\quad}$  and  $5 - 5 = \underline{\quad}$ , and discuss how to demonstrate them on the number line.



LESSON OUTCOME

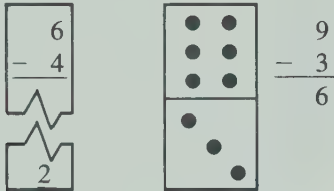
Use the vertical form for subtraction

Vocabulary

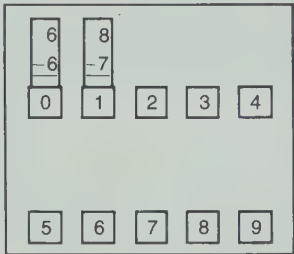
subtract

RELATED ACTIVITIES

- Use commercial or teacher-made jigsaw cards that match if the answer is correct.
- Arrange dominoes so that children can write the corresponding subtraction facts in vertical form (minuends to 9).



- Prepare a pocket chart from cardboard and library card pockets as shown. Prepare cards with subtraction facts in vertical form.



Children can place the card for a subtraction fact in the appropriate answer pocket. They may find, for example, the seven cards that belong in the pocket for 3.

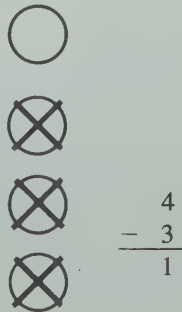
LESSON ACTIVITY

Before Using the Page

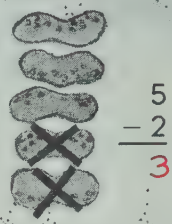
- The vertical form for subtraction provides the child with another way of writing a number fact, and the introduction of this concept provides a review of subtraction facts.

Draw seven objects in a row on the chalkboard and cross out three of them. Then ask a child to write the sentence (7 - 3 = 4).

Draw four objects in a column and cross out the last three. Ask how many objects there were and how many have been taken away. Write the appropriate numerals in vertical form. Ask how many are left and complete the subtraction example. Ask what symbol should be written in front of the 3 to show subtraction. Use other examples of subtraction in vertical form.



Subtract.



$$\begin{array}{r} 6 \\ - 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 7 \\ - 1 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 9 \\ - 5 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 3 \\ - 2 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 4 \\ - 0 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 \\ - 3 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 5 \\ - 4 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 8 \\ - 6 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 7 \\ - 7 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 7 \\ - 5 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 6 \\ - 6 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 5 \\ - 1 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 3 \\ - 3 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 8 \\ - 7 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 9 \\ - 0 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 7 \\ - 4 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9 \\ - 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 8 \\ - 4 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 7 \\ - 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 8 \\ - 5 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 4 \\ - 3 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 6 \\ - 0 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 7 \\ - 3 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 \\ - 4 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ - 7 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ - 2 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ - 2 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 9 \\ - 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 \\ - 6 \\ \hline 3 \end{array}$$

28 (twenty-eight)

Using the vertical form for subtraction, minuends to 9

Using the Page

- Have children read the word "Subtract" at the top of the page. Discuss the first example with the children. Ask how many acorns there are, how many acorns are crossed out, and how many acorns are left. Have the children trace over the dotted 3. Discuss the second example in a similar way and have the children write the answer.

Ask the children how many acorns are shown on the right side of the page. Have them cover three acorns with one hand. Ask how many acorns they can see. Have a child state the subtraction fact (9 - 3 = 6). Tell the children that they may use these acorns as counters if they need help in completing the exercises.

- After the children have completed the exercises, ask them to ring four exercises that they found difficult. Have them practise these subtraction facts in their spare time.

## LESSON OUTCOME

Add and subtract amounts of money, to 9 cents

### Materials

real money, play money, or coin cutouts from copies of page T327, chart for recording transactions, play store or store chart

### RELATED ACTIVITIES

- Prepare several change purses or coin envelopes, each containing a different amount of money to 9 cents. Code the change purses by color or letter and keep a record of the amount of money in each purse.

Give a purse to each child. Have the children determine the value of the coins. Ask each child questions similar to the following:

“How much do you have to spend?”

“If you bought the toy car, how much would you pay?”

“How much money would you have left?”

“If you bought the toy car and the whistle, how much would you pay?”

“How much would you have left?”

Have the children use the coins in the purses to help determine or check their answers. Let the children exchange purses and use the new amount of money to complete another transaction. Have the children print the number story for each transaction.

- Have the children continue to use the play store or the store chart.

Complete.

| I have | I buy  | I have left |
|--------|--------|-------------|
| 5¢     | for 2¢ | 5-2 = 3¢    |
| 8¢     | for 3¢ | 8-3 = 5¢    |
| 7¢     | for 1¢ | 7-1 = 6¢    |
| 6¢     | for 4¢ | 6-4 = 2¢    |
| 9¢     | for 5¢ | 9-5 = 4¢    |
| 8¢     | for 5¢ | 8-5 = 3¢    |
| 7¢     | for 3¢ | 7-3 = 4¢    |
| 5¢     | for 4¢ | 5-4 = 1¢    |
| 6¢     | for 6¢ | 6-6 = 0¢    |

Adding and subtracting with money amounts to 9 cents

(twenty-nine) 29

## LESSON ACTIVITY

### Before Using the Page

- Although the page does not involve making change for a nickel, this concept does arise in activities at the play store. Review the terms *penny*, *nickel*, *cent*, and also the fact that one nickel has the same value as five pennies.

- Work with children in small groups at the play store or with a store chart as suggested on page T24. Have each child “buy” two objects, state the total price, and tell what coins would be used to pay. Ask the children to state two ways of paying for something that costs 5 cents.

- Give each child a nickel to buy one object costing less than 5 cents. As each child gives the nickel to you, the storekeeper, count out the change saying slowly, for example, “The whistle costs 2 cents; 3 cents, 4 cents, 5 cents. How much money do you have left?” After the purchase, have the child record the transaction on a chart.

| I have | I spend | I have left |
|--------|---------|-------------|
| 5¢     | 2¢      | 5-2 = 3¢    |

### Using the Page

- Point to each nut in turn and ask children to state the price associated with it. You may wish to refer to the nuts by name (peanut, Brazil nut, pecan, almond, walnut, hazelnut).

For the first exercise, ask how much money I have and how much the peanut costs. Have the children trace over the dotted 2. Then ask what 5 - 2 tells and have the children trace over the dotted symbols. Ask how much money I have left. Note that the symbol = is not shown between the subtraction phrase and the answer because the symbol ¢ is written only with the answer. Have the children trace over the dotted 3.

For the purchase of two nuts in the last four exercises, some children may wish to write the price beside each nut to help in determining the total price.



## LESSON OUTCOME

Order the numbers from 10 to 20

### Materials

display board and cutouts, ten cards (20 cm by 30 cm each) showing the numerals 11 to 20, ten cards for each child to make numeral cards for 11 to 20, demonstration number line, flash cards for *after*, *before*, *between* and for the number words *eleven* to *twenty*

### Vocabulary

number words *eleven* to *twenty*

## RELATED ACTIVITIES

- Have the children count forward to 20. Point out that each new number is the one that comes *after* the number just named. Then have them count backward and point out that each new number is the one that comes *before* the number just named.
- Prepare a work sheet of a number line marked from 0 to 20. Give a copy to each child. Have the children draw a square around the number that comes after each of several numbers that you name. Have them draw a circle around the number that comes before each of several other numbers that you name. Have them mark a check on the number that comes between 2 and 4, 10 and 12, 16 and 18, for example. Discuss numbers that have not been marked.
- Play the game "Concentration" described on page T57 for two or more players.

Complete.

10 and 0 10

10 and 1 11

10 and 2 12

10 and 3 13

10 and 4 14

10 and 5 15

10 and 6 16

10 and 7 17

10 and 8 18

10 and 9 19

10 and 10 20

What number comes after ?

|              |              |              |              |
|--------------|--------------|--------------|--------------|
| 10 <u>11</u> | 12 <u>13</u> | 18 <u>19</u> | 15 <u>16</u> |
| 17 <u>18</u> | 11 <u>12</u> | 19 <u>20</u> | 13 <u>14</u> |

What number comes before ?

|              |              |              |              |
|--------------|--------------|--------------|--------------|
| <u>12</u> 13 | <u>15</u> 16 | <u>17</u> 18 | <u>11</u> 12 |
| <u>13</u> 14 | <u>14</u> 15 | <u>16</u> 17 | <u>18</u> 19 |

What number comes between ?

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| 10 <u>11</u> 12 | 17 <u>18</u> 19 | 13 <u>14</u> 15 |
| 15 <u>16</u> 17 | 12 <u>13</u> 14 | 18 <u>19</u> 20 |
| 16 <u>17</u> 18 | 11 <u>12</u> 13 | 14 <u>15</u> 16 |

30 (thirty)
Order of the numbers from 10 to 20

## LESSON ACTIVITY

### Before Using the Page

- Rote count from 1 to 20 with the children, paying special attention to the numbers from 10 to 20. Place ten cutouts on the display board. Have a child place one more cutout to make 11. Continue this procedure of placing one more cutout until there are 20 cutouts on the display board. Keep the group of ten cutouts slightly separated from the second group.
- Place large numeral cards for 11 to 20 in any order along the chalkboard ledge. Have children place the cards in sequence. Count with the children again, using the cards for reference.
- Extend the demonstration number line to include the numbers from 11 to 20. Count with the children from 1 to 20, referring to the number line. Discuss numbers that come after, before, or between other numbers. Concentrate on the numbers from 10 to 20 and refer to the number line, if necessary.
- Have the children extend their numeral cards for 0 to 10 to include 11 to 20. Use the flash cards for the words *after*, *before*, and *between* with the children. Name a number, show one of the

flash cards, and have the children respond by displaying the appropriate numeral card.

- Make flash cards for the number words *eleven* to *twenty*. Use these with the children and have them read the word or respond by displaying the appropriate numeral card.

### Using the Page

- Ask how many beans there are in the first row on the blue shape. Then ask how many beans there are on the green shape. Say, "Ten and zero are how many?" Repeat the questions for the next four rows and then have the children complete the rows to 20. After the children have completed the last row, direct their attention to the middle column of numbers from 0 to 10 and the corresponding ones' digits of the numbers in the column at the right. This can be the beginning of an awareness of place value.
- For the second part of the page, read the instructions with the children and then let them work independently.

6 7 8 9 10 11 12 13 14

Ring the numbers greater than

Check the numbers less than

15 16 17 18 19 20

Write the numbers that are less than.  
Write the numbers that are greater than.

3 4 5 15 16 17 5 6 7  
11 12 13 9 10 11 13 14 15  
18 19 20 8 9 10 12 13 14

Complete.

16 17 18 19 20 9 10 11 12 13  
 13 14 15 16 17 12 14 16 18 20

Identifying numbers greater than or less than numbers to 20 (thirty-one) 31

## LESSON OUTCOME

Identify numbers greater than or less than numbers to 20

## Materials

display board and cutouts, numeral cards for 0 to 20 and 20 counters for each child, demonstration number line, flash cards for *greater than*, *less than*, objects for grouping by tens (optional)

## RELATED ACTIVITIES

- Play the game "Road Race" described on page T57 for two or more players.
- Display the large numeral cards for 0 to 20 in order. Have children start at 0, remove 1, leave 2, remove 3, and so on. Have the children say the numbers left in order (skip count by twos). You may wish to mention that these numbers are called *even* numbers. Adapt the activity for the odd numbers to 19.

## LESSON ACTIVITY

## Before Using the Page

- Display ten and then four more cutouts. Have the children hold up their appropriate numeral cards to show how many cutouts there are altogether. Ask children in turn to change the number of cutouts on the display board for the other children to identify with their numeral cards.
- Point to a number on the number line for 0 to 20. Have the children use their counters to make the corresponding set. Discuss the sets for numbers greater than ten by having the children think of 14, for example, as "10 and 4 more". Some children may be ready to group 10 ones into a bundle to make "1 ten". Twist ties or pipe cleaners can be used to fasten together ten rubber rings, record discs, paper clips, and so on, to make bundles of ten.
- Draw a ring around 12 on the number line and display the flash card for *greater than*. Have the children use their counters to make a set that has more than 12 members and then hold up their numeral cards to indicate the number of the set they made.

A quick glance will show you which children are thinking only of 13 and which have gone beyond 13 (to 20). Discuss their answers. Repeat the procedure by erasing the ring around 12 and indicating a different number. Continue the activity, using the flash card for *less than*.

- Ring one number on the number line. Ask a child to point to and say all the numbers that are less than that number. Have a child point to and say all the numbers (to 20) that are greater than the number indicated. After several examples, ask the children which way we move on the number line to find numbers that are greater than a given number and which way, to find numbers that are less than a given number.
- Point to 15 on the number line. Have a child point to each number and count on to 20. Point to 5 and have a child count on to 13. Use other examples.

## Using the Page

- Read the instructions with the children and discuss how they are to complete the exercises. Some children may need to use the number line on the page for assistance.



# LESSON OUTCOME

Complete basic subtraction facts, minuends to 9

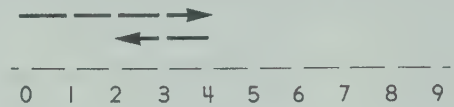
## Materials

subtraction phrases on cards, number line for each child, overhead projector (optional)


## RELATED ACTIVITIES

• Use a copy of page T331 or T341 to prepare a work sheet showing number lines marked from 0 to 9. Write an incomplete subtraction sentence below each of several number lines. Have the children draw arrows above each number line to show the result and then complete the subtraction sentence. For each of several other number lines, draw arrows above the line. Have the children write the appropriate subtraction sentence for each number line.

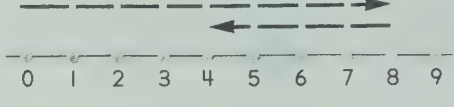
**Complete.**



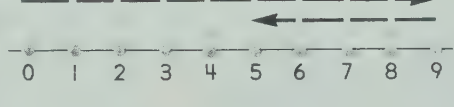
$4 - 2 = \underline{2}$




$7 - 3 = \underline{4}$



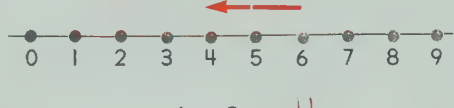
$\underline{8} - \underline{4} = \underline{4}$



$\underline{9} - \underline{4} = \underline{5}$



$5 - 5 = \underline{0}$



$6 - 2 = \underline{4}$

**Subtract.**

|  |  |  |
|--|--|--|
| $\begin{array}{r} 3 \\ -2 \\ \hline 1 \end{array}$ | $\begin{array}{r} 9 \\ -0 \\ \hline 9 \end{array}$ | $\begin{array}{r} 5 \\ -4 \\ \hline 1 \end{array}$ |
| $\begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$ | $\begin{array}{r} 6 \\ -4 \\ \hline 2 \end{array}$ | $\begin{array}{r} 9 \\ -6 \\ \hline 3 \end{array}$ |
| $\begin{array}{r} 7 \\ -5 \\ \hline 2 \end{array}$ | $\begin{array}{r} 2 \\ -1 \\ \hline 1 \end{array}$ | $\begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$ |
| $\begin{array}{r} 4 \\ -3 \\ \hline 1 \end{array}$ | $\begin{array}{r} 7 \\ -2 \\ \hline 5 \end{array}$ | $\begin{array}{r} 6 \\ -3 \\ \hline 3 \end{array}$ |
| $\begin{array}{r} 5 \\ -3 \\ \hline 2 \end{array}$ | $\begin{array}{r} 4 \\ -4 \\ \hline 0 \end{array}$ | $\begin{array}{r} 9 \\ -3 \\ \hline 6 \end{array}$ |
| $\begin{array}{r} 8 \\ -5 \\ \hline 3 \end{array}$ | $\begin{array}{r} 5 \\ -2 \\ \hline 3 \end{array}$ | $\begin{array}{r} 7 \\ -4 \\ \hline 3 \end{array}$ |
| $\begin{array}{r} 8 \\ -6 \\ \hline 2 \end{array}$ | $\begin{array}{r} 9 \\ -2 \\ \hline 7 \end{array}$ | $\begin{array}{r} 3 \\ -3 \\ \hline 0 \end{array}$ |
| $\begin{array}{r} 9 \\ -5 \\ \hline 4 \end{array}$ | $\begin{array}{r} 6 \\ -0 \\ \hline 6 \end{array}$ | $\begin{array}{r} 9 \\ -7 \\ \hline 2 \end{array}$ |

32 (thirty-two)

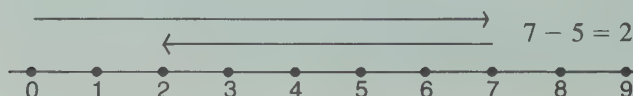
Subtraction practice: minuends to 9

## LESSON ACTIVITY

### Before Using the Page

• Draw several number lines on the chalkboard, or prepare a transparency showing several number lines. Use the overhead projector to project the image directly on the chalkboard. Prepare several cards showing subtraction phrases such as  $7 - 4$ ,  $5 - 5$ ,  $6 - 0$ , and distribute them to as many children. Have each child, in turn, draw arrows above a number line on the chalkboard to illustrate what is shown on her/his card. Have the other children interpret the illustration. Ask children to write the subtraction sentences on the chalkboard.

Have the children work individually or in pairs using their own number lines to demonstrate the subtraction phrase on each card. Have them exchange cards and repeat the procedure. You may wish to show the children how one long arrow can be used in place of short segments to show a move on the number line.



### Using the Page

- Discuss the first exercise with the children. Have them use a finger to trace the arrows on the number line. Have them trace over the dotted 2. Then let the children continue on their own, but point out that they are to draw the arrows for the last two number lines.
- After the children have completed the first part of the page, have them complete the subtraction exercises in vertical form. The children may refer to the number lines for assistance in completing these exercises.

**LESSON OUTCOME**

Measure the capacity of a container using a non-standard unit

**Materials**

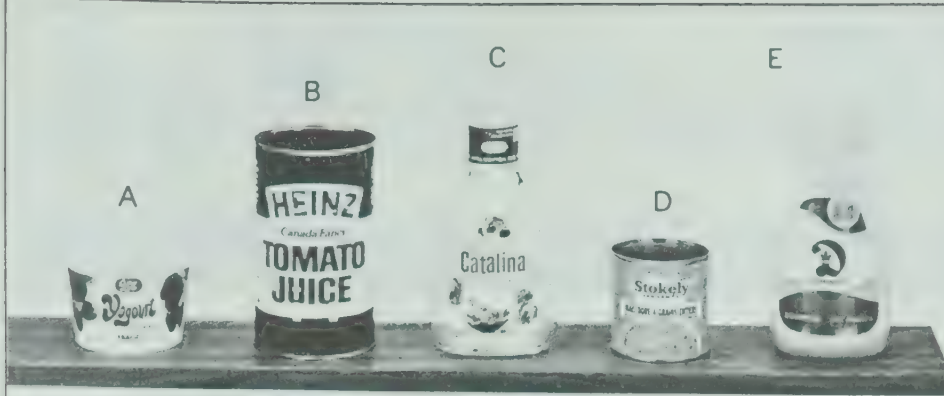
containers of various sizes (including those shown on the page), water, sand, or other material suitable for pouring, funnel

**Vocabulary**


container, holds more, holds less, fill, pour, empty


**RELATED ACTIVITIES**

- In their spare time, children may work on tasks similar to the following:
  1. How many spoonfuls of sand will fill an egg cup?
  2. Find a tall, narrow jar and a short, wide jar. Which jar holds more?
  3. Find the jars marked A, B, C, and D (four jars having different shapes but the same capacity). Place the jars in the order that you think is from least to greatest capacity. Find out if you are right. Write about what you discovered.
- If you wish to test a child's ability to conserve volume, see page xvii.





Fill each container using a  Answers will vary.

A holds about \_\_\_\_\_  's

B holds about \_\_\_\_\_  's

C holds about \_\_\_\_\_  's

D holds about \_\_\_\_\_  's

E holds about \_\_\_\_\_  's

Ring.

Which container holds more? A or E B or E

Which container holds less? A or D C or E

Which container holds the most? A B C D E

Which container holds the least? A B C D E

Measuring capacity using non-standard units

(thirty-three) 33

**LESSON ACTIVITY****Before Using the Page**

- Determine whether the children have had previous experience with non-standard units of capacity. If not, it may be necessary to provide opportunities for play with sand and water. The children should perform pouring experiments to discover the relationships between containers. Collect a variety of small containers and a few larger ones.
- Have the children indicate which of two containers they think holds more (less). Have them fill one container and pour the contents into the other to check their answers. By pouring and comparing, have them find two containers that hold about the same amount.
- In this activity the children use a small non-standard unit to measure the capacity of a larger container. There are two ways to proceed.

1. Fill the larger container (a pop bottle). Ask the children to pour the contents into the small container (a paper cup) and count how many times the small container can be filled from the larger container.

2. Place the larger container on a level surface. Ask the children to fill it using the small container (a funnel will be helpful) and count how many of the small containers are needed to fill the larger one.

Children will naturally round off their answers, but you may wish to mark a line on the larger container and have the children fill it to that mark. If the children work in pairs, one can fill and pour while the other counts and records. The results may be printed in the form of a chart or as a story with illustrations.

**Using the Page**

- If the five containers shown are not easily available, you may need to make replacements. You should measure the capacity of each container chosen before assigning the work to the children in order to determine what difficulties they may encounter. The children can fill the containers with water, sand, or other items as listed on page xxxi under materials for measurement.



LESSON OUTCOME

Estimate the capacity of a container using a non-standard unit; measure to check an estimate of capacity

Materials

containers of various sizes (including those shown on the page), water, sand, or other material suitable for pouring, funnel

RELATED ACTIVITIES

- Prepare work cards for different non-standard units of capacity that the children have been using. If the children are using liquid for measuring, add several drops of food coloring and extract of peppermint to water. The color and smell will appeal to the children.

| Container | Dixie Cups |         |
|-----------|------------|---------|
|           | Estimate   | Measure |
| A         | 10         | 9       |
| B         |            |         |

- Prepare charts for the children to draw the container to be measured and to show an estimate and a measurement using one or more non-standard units.

| Container | Unit     |         |
|-----------|----------|---------|
|           | Estimate | Measure |
|           | 7        | 8       |
|           | 4        | 4       |
|           |          |         |

LESSON ACTIVITY

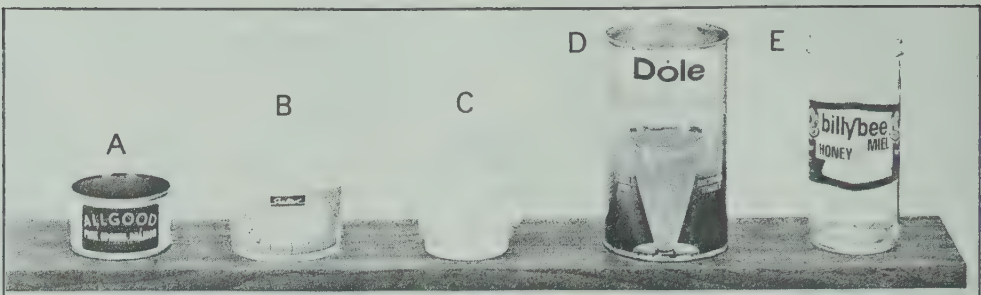
Before Using the Page



- An estimate is not a guess but a carefully considered opinion. A reasonable estimate of any measurement indicates an understanding of that measurement. When children have had considerable experience in measuring capacity with one particular non-standard unit, they are ready to consider estimating with that unit.

Work with small groups of children at a time. You may prepare charts in advance for this work.

| Estimate | Can | Jar |
|----------|-----|-----|
| Susan    | 8   | 7   |
| Bob      | 7   | 6   |
| Lisa     | 9   | 7   |

Ask the children how many non-standard units they think will fill a given container. Record all the estimates before any measurements are made. Help the children to fill the container and indicate who had reasonable estimates.



Estimate how many  's you think *Answers will vary.*  
each container will hold. Ring them. Measurement in  's

A 

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

 about \_\_\_\_\_

B 

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
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 about \_\_\_\_\_

C 

|  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |
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 about \_\_\_\_\_

D 

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

 about \_\_\_\_\_

E 

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

 about \_\_\_\_\_

Ring.

Which container holds more? A or B D or E

Which container holds less? B or C B or E

Which container holds the most? A B C D E

Which container holds the least? A B C D E

Estimate first and then measure to find how many small containers fill each of the larger containers.

34 (thirty-four) Estimating and measuring capacity using non-standard units

- Occasions involving capacity often arise naturally in the classroom. Take advantage of these for having the children make estimates. For example, at a party there may be lemonade. Ask the children to estimate how many servings there will be in one jug of lemonade.

Using the Page

- If the five containers shown are not easily available, you may need to make replacements. You should measure the capacity of each container chosen before assigning the work to the children in order to determine whether any container holds more than ten of the non-standard units. As only ten jars are shown for the estimate of each container, the children may need to draw extra jars if any of their estimates exceed ten units.

## LESSON OUTCOME

Complete addition sentences for sums of 10

## Materials










number line, chart paper, ten counters, display board and cutouts

## RELATED ACTIVITIES

- Prepare a work sheet of 11 rows with 10 squares in each. Give each child 20 cubes or other objects, ten of one color and ten of another color. Have the children make a row of ten cubes using whatever number of each of the two colors they wish. Then have them color one row of ten squares to show what combination was used and write the corresponding addition sentence. Have them continue until all the possible number combinations for ten are shown.

A counting device like the elevator beads described on page xxxi is also useful for showing the number combinations for this activity.

Complete.

|   |   |   |
|---|---|---|
| <br>$9 + 1 = 10$ | <br>$8 + 2 = 10$ | <br>$7 + 3 = 10$ |
| <br>$6 + 4 = 10$ | <br>$5 + 5 = 10$ | <br>$4 + 6 = 10$ |
| <br>$3 + 7 = 10$ | <br>$2 + 8 = 10$ | <br>$1 + 9 = 10$ |

|              |              |              |
|--------------|--------------|--------------|
| $4 + 6 = 10$ | $2 + 8 = 10$ | $6 + 4 = 10$ |
| $1 + 9 = 10$ | $5 + 5 = 10$ | $3 + 7 = 10$ |
| $7 + 3 = 10$ | $8 + 2 = 10$ | $9 + 1 = 10$ |

Addition facts sums of 10 (thirty-five) 35

## LESSON ACTIVITY

### Before Using the Page

- Begin by discussing the significance of ten: we have ten fingers and ten toes; ten pennies can be exchanged for one dime; ten is the basis of our counting system and our measurement system; ten is the first number represented by a two-place numeral in our numeration system. Have some children show how to print 10 on the chalkboard.

- Start at a number on the number line. Have children determine the number of single jumps needed to reach 10. Record the result in a chart. Have children select other starting points and record the results. Continue until they feel they have found all possible starts and jumps. Ask them to match similar combinations in the chart, for example, "start at 7 and jump 3" and "start at 3 and jump 7" will be matched. (The 5 and 5 combination will be unmatched.)

- Place ten counters on a table. Have children, in turn, pick up

| To reach 10 |          |
|-------------|----------|
| start at    | and jump |
| 7           | 3        |
| 10          | 0        |
| 5           | 5        |
| 3           | 7        |
| 6           | 4        |

some with one hand and the rest with the other hand. Discuss the different ways the children did this and record the results on the chalkboard.

- Display ten cutouts. Have a child partition the set and record the result.



$3 + 7 = 10$

Have the children find and record all the ways they can partition a set of ten objects. The combinations 0 and 10, and 10 and 0 should be included.

### Using the Page

- Have the children count the sunflowers at the top of the page. They may use these, if necessary, for completing the addition sentences at the bottom of the page.

For the first exercise, ask how many seeds there are in the first set, how many there are in the second set, and how many there are altogether. Have the children trace over the dotted 10. Then let the children work independently.



## LESSON OUTCOME

Write an addition sentence that describes an additive situation

## Materials

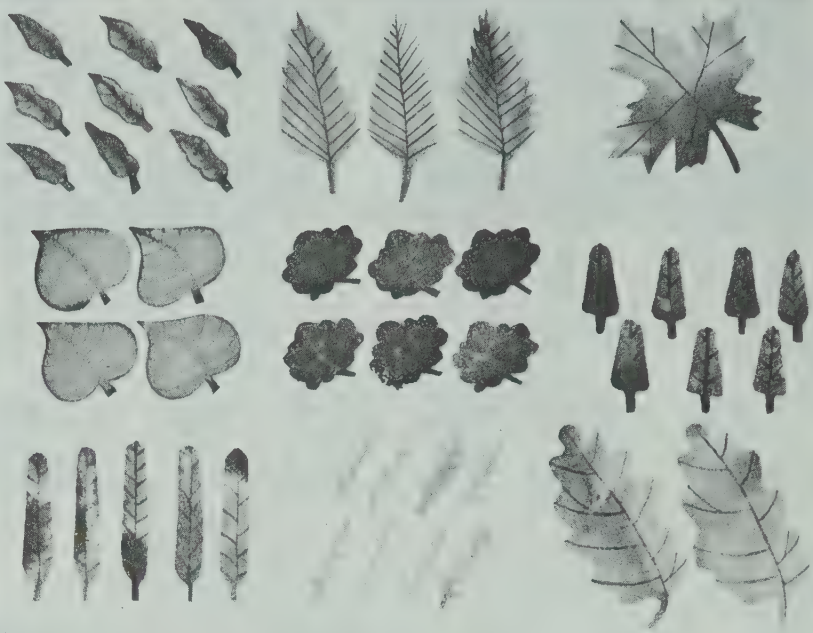
number board and tags, attribute blocks or other colored blocks

## Vocabulary


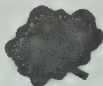
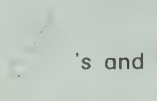


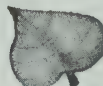



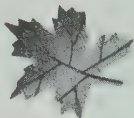
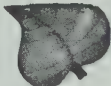
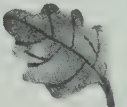
addition phrase

## RELATED ACTIVITIES

- Play the following game. You will need a game board showing rows of squares numbered from 0 to 60 (or any other suitable number), two dice marked 0, 1, 2, 3, 4, 5, and a marker for each player. Adapt copies of page T333 or T335 for the game board. Have the children take turns rolling the dice, calculating the sum of the numbers rolled, and moving their markers that number of squares. The first player to reach the last square is the winner.
- Have from two to four players play the following game using dot-pattern and/or numeral dominoes. Place the dominoes face down. Each player selects the same number of dominoes and stands them on edge so that no other player can see them. One domino from the face-down pile is turned up. Players take turns placing a domino so that the sum of the adjoining halves is six (or some other pre-selected number). Since most commercial domino sets stop at nine as the greatest number, you may wish to include pieces for sums of ten.



Write a number sentence for each.

|  |  |
|--|--|
|  's and  's<br>$3 + 6 = 9$     |  's and  's<br>$8 + 2 = 10$    |
|  's and  's<br>$6 + 4 = 10$  |  's and  's<br>$5 + 1 = 6$   |
|  's and  's<br>$7 + 1 = 8$ |  's and  's<br>$4 + 2 = 6$ |

36 (thirty-six)

Writing addition sentences, sums to 10

## LESSON ACTIVITY

### Before Using the Page

- Adapt the number board described on page T322 as an addition table (no answer tags showing). Have several children hang all the tags first for a sum of 10. Then hang all the tags for a different sum, say, 4. Continue until all the sums to 10 have been placed. As the children hang the tags, they should say the addition phrase that corresponds to that sum. For example, the phrases for a sum of 3 are  $0 + 3$ ,  $1 + 2$ ,  $2 + 1$ , and  $3 + 0$ . Discuss the pattern formed by each set of sums. (All identical sums appear on a diagonal.)
- Conduct a quick oral drill of sums to 10. Refer to the number board, if necessary.
- Display attribute blocks or other colored blocks in front of the children, for example, four red blocks, three blue blocks, five yellow blocks. Ask how many blocks of each color there are. Ask how many red blocks and blue blocks there are together. Have a child state the appropriate addition sentence. Ask another child to write the addition sentence on the chalkboard. Ask how many blue blocks and yellow blocks there are together.

Have another child state the appropriate addition sentence and write it on the chalkboard. Continue in a similar manner for other numbers of blocks of each color.

You may wish to have children choose the number of blocks for each color and state the corresponding addition sentence.

### Using the Page

- Ask the children how many sets of different kinds of leaves are shown on the first part of the page. Ask how many leaves there are in the first set. Have the children ring the set and write "9" beside the set. Have the children ring each set of leaves and record the number of leaves. This step will make it easier for the children to write the appropriate addition sentence for each combination of leaves.

After the children have completed the page, ask them, in turn, to read the addition sentences.

Balance each object with pennies. *Answers will vary.*

|   |  |                     |
|---|--|---------------------|
| A |  | about _____ pennies |
| B |  | about _____ pennies |
| C |  | about _____ pennies |
| D |  | about _____ pennies |
| E |  | about _____ pennies |
| F |  | about _____ pennies |
| G |  | about _____ pennies |

Ring the heavier object.

Order the masses from lightest to heaviest.

A or D

C or F

B or D

G or E

first A

second B

third E

fourth G

fifth C

sixth D

seventh F

Use balance scales to measure the mass of each object in pennies

Measuring mass using non-standard units

(thirty-seven) 37

## LESSON OUTCOME

Measure the mass of an object using a non-standard unit

### Materials

balance scales, non-standard units of mass including 20 pennies, small objects for which the masses are to be determined (including those shown on the page)

### Vocabulary

heaviest, lightest

## RELATED ACTIVITIES

- Have the children use other non-standard units of mass. (See page xxxi.) Prepare work sheets that show objects and non-standard units of mass to be used for determining the masses. Make these available for the children to use in their spare time.
- Provide the children with a collection of small objects (paper clips, buttons, beads, bottle caps, paper clips, dice, spools, pens, clothes pins). Have them find out how many of each of the small objects will be balanced by, say, 6 pennies. Have the children record their results in either pictures or words; for example, "7 buttons balance 6 pennies."

## LESSON ACTIVITY

### Before Using the Page

- Through experiences involving non-standard units of mass, children develop an understanding of the mass of an object before they encounter standard units.

Using the balance scales, review with the children the concepts *heavier than*, *lighter than*, and *the same mass as*. Then introduce a non-standard unit of mass, such as a penny, nail, screw, metal washer, marble, or bottle cap. Tell the children you would like to find out how many pennies will balance a pencil. Have children help to count the pennies as you put them in the pan and determine when the balance is level. Record the result on the chalkboard or on chart paper. Have a child interpret the result; for example, "Three pennies balance the pencil." Repeat the procedure for other objects.

- Have the children work in groups exploring freely the number of pennies needed to balance any of several small objects available in the classroom (sponge, cork, pencil case, ball of string, toy car, candle). At this time, limit the objects to those that can

be balanced by fewer than 20 pennies. You may wish to have the children record their findings on a chart.

### Using the Page

- If the seven objects shown are not easily available, you may need to make replacements. If you choose to use another non-standard unit instead of a penny, use it also for page 38. You should measure the mass of each object in terms of the non-standard unit before assigning the work to the children in order to determine what difficulties they may encounter.

You may wish to have the children work together to balance each object and then record the answers in their own books.

For the second and third exercises, the children may use their answers to determine which object in each pair is heavier (although some children will want to verify this by balancing the two objects) and to establish the order of the masses.



LESSON OUTCOME

Estimate the mass of an object using a non-standard unit; measure to check an estimate of mass

Materials

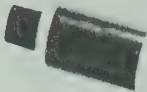
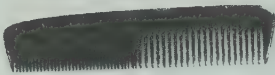
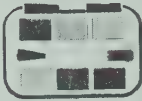
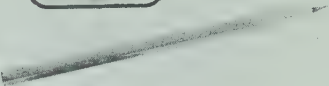
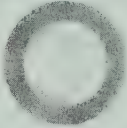

balance scales, non-standard units of mass including 20 pennies, small objects for which the masses are to be determined (including those shown on the page)

RELATED ACTIVITIES

- Provide the children with several groups of small objects (beans, bottle caps, clothes pins). Have them estimate how many of each of the small objects will be balanced by, say, 5 pennies. Have them record their estimates and then use the balance scales to measure the masses. The results may be recorded either in pictures or words.
- Have the children roll some Plasticine into a ball. Then have them use more Plasticine and the balance scales to make another ball that will balance the first one. Have them make five of these balls. Ask the children to use the Plasticine balls to balance some things in the classroom. Have them draw pictures or print a story about each of their discoveries.

Estimate how many pennies will balance each object.

Answers will vary.

|   | Estimate<br>in pennies | Measurement<br>in pennies |
|---|------------------------|---------------------------|
| A  | about _____            | about _____               |
| B  | about _____            | about _____               |
| C  | about _____            | about _____               |
| D  | about _____            | about _____               |
| E  | about _____            | about _____               |
| F  | about _____            | about _____               |

Which object is the heaviest? \_\_\_\_\_

Which object is the lightest? \_\_\_\_\_

Order the masses from lightest to heaviest.

| first | second | third | fourth | fifth | sixth | seventh |
|-------|--------|-------|--------|-------|-------|---------|
| _____ | _____  | _____ | _____  | _____ | _____ | _____   |

Estimate first. Use balance scales to check the estimates.

LESSON ACTIVITY

Before Using the Page

- Allow the children as much time as possible to use the balance scales in free exploration of non-standard units of mass to balance various objects. Charts prepared for the children will help them to organize their discoveries. Estimates should be recorded before any measurements are made.

| Object | Measurement |            |          |
|--------|-------------|------------|----------|
|        | in marbles  | in pennies | in beans |
| Ball   |             |            |          |
| Hat    |             |            |          |
| Eraser |             |            |          |
| Sponge |             |            |          |
|        |             |            |          |
|        |             |            |          |

| Object         | Estimate in shells | Measurement in shells |
|----------------|--------------------|-----------------------|
| Pencil         |                    |                       |
| Box of crayons |                    |                       |
|                |                    |                       |

Using the Page

- If the seven objects shown are not easily available, you may need to make replacements. Use the same non-standard unit as for page 37. You should measure the mass of each object in terms of the non-standard unit before assigning the work to the children in order to determine what difficulties they may encounter.  
Have the children handle each object and estimate its mass in terms of the non-standard unit. Have them record all their estimates before using the balance scales for measuring the masses.  
After measuring the masses of objects A to G, have the children refer to their answers and record the heaviest object, the lightest object, and the masses in order from lightest to heaviest.

These are other names  
for 8.

These are not names  
for 8.

$3 + 5$

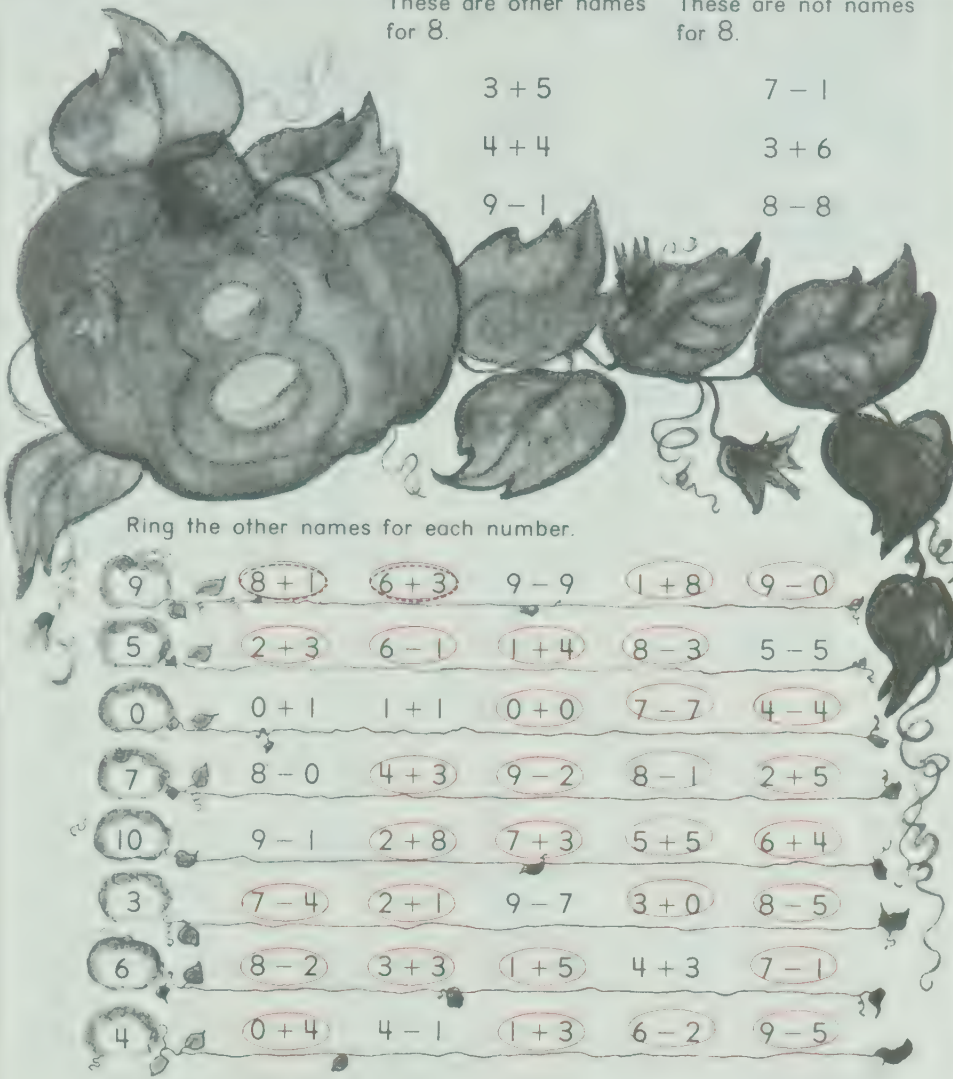
$7 - 1$

$4 + 4$

$3 + 6$

$9 - 1$

$8 - 8$



Identifying names for numbers to 10

(thirty-nine) 39

## LESSON OUTCOME

Recognize different names for the same number

### Vocabulary

subtraction phrase

## RELATED ACTIVITIES

- Have the children illustrate the different addition phrases for a number by coloring squares or pasting rows of gummed dots in two colors, or by joining Unifix cubes in two colors.
- Have the children carry out instructions similar to these: clap 2 + 2 times; draw 4 - 3 sticks.
- Have the children use a check to show all the phrases they can find in the eight rows that name numbers less than 5 (including the ones on the small pumpkins). There are 20.
- After the children have completed the page, have them state the number named by each addition or subtraction phrase that is not ringed.

## LESSON ACTIVITY

### Before Using the Page

- Begin with a quick oral drill using addition and subtraction phrases such as  $4 + 5$ ,  $9 - 3$ , and  $8 + 2$ .
- Write on the chalkboard about six addition and subtraction phrases such that all but two or three have 5 as the sum or the difference. Have children ring all those that are names for 5 and mark an X through all those that are not names for 5. Emphasize that those that are ringed are other names for the number five.

Write the heading "Names for 4" on the chalkboard and under this have children write addition and subtraction phrases that are other names for the number four. Repeat for other numbers.

- Ask the children to write down all the addition phrases they can think of that are names for 4. Have a child read her/his answers while you record them on the chalkboard. If the order does not show a pattern, ask children to help you order the names. You may start by writing  $0 + 4$  first to help them. Then have them write all the subtraction phrases that are other names for 4. Copy one child's answers and have other children help to

rearrange them. One child may suggest starting with  $9 - 5$ ; another may suggest starting with  $4 - 0$ .

|         |         |
|---------|---------|
| $0 + 4$ | $4 - 0$ |
| $1 + 3$ | $5 - 1$ |
| $2 + 2$ | $6 - 2$ |
| $3 + 1$ | $7 - 3$ |
| $4 + 0$ | $8 - 4$ |
|         | $9 - 5$ |

### Using the Page

- Discuss the names given for 8 at the top of the page. Discuss the ones given that are not names for 8. Ask what number each phrase names. Read the instruction with the children. Ask what number is shown on the first pumpkin. Ask whether  $8 + 1$  and  $6 + 3$  are names for 9. Have the children trace over the dotted rings. Ask whether  $9 - 9$  is a name for 9. Ask whether  $1 + 8$  is a name for 9 and have the children ring it. Continue for  $9 - 0$ . Then let the children work independently.



## LESSON OUTCOME

Determine the missing second addend in an addition sentence, sums to 10

### Materials

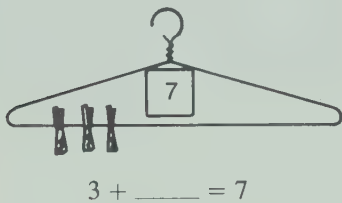
beads, display board and cutouts, ten counters for each child

### Background

The concept of a place holder can be a difficult one for children to understand. However, the experience the children have had in writing number sentences from given situations should make the concept of a missing addend easier for them to grasp. In this unit the missing addend is always the second addend in an addition sentence.

## RELATED ACTIVITIES

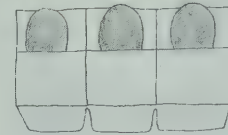
- Prepare coat hangers with a numeral card attached as shown. Fasten some clothes pins at one end (fewer than the number represented on the numeral card). Have the children attach the number of extra clothes pins required and write the appropriate addition sentence.



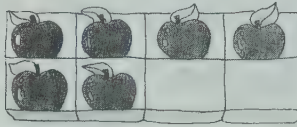
Complete the number sentences.



$$1 + \underline{3} = 4$$



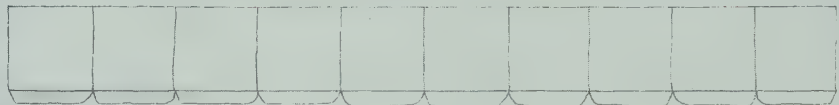
$$3 + \underline{3} = 6$$



$$6 + \underline{2} = 8$$



$$6 + \underline{4} = 10$$



$$\begin{array}{l} 4 + \underline{3} = 7 \\ 3 + \underline{7} = 10 \\ 5 + \underline{4} = 9 \\ 4 + \underline{4} = 8 \end{array}$$

$$\begin{array}{l} 2 + \underline{3} = 5 \\ 4 + \underline{5} = 9 \\ 3 + \underline{4} = 7 \\ 4 + \underline{6} = 10 \end{array}$$

$$\begin{array}{l} 5 + \underline{2} = 7 \\ 1 + \underline{7} = 8 \\ 1 + \underline{8} = 9 \\ 3 + \underline{6} = 9 \end{array}$$

$$\begin{array}{l} 1 + \underline{1} = 2 \\ 2 + \underline{1} = 3 \\ 3 + \underline{1} = 4 \\ 4 + \underline{1} = 5 \end{array}$$

$$\begin{array}{l} 2 + \underline{8} = 10 \\ 2 + \underline{7} = 9 \\ 2 + \underline{6} = 8 \\ 2 + \underline{5} = 7 \end{array}$$

$$\begin{array}{l} 6 + \underline{0} = 6 \\ 1 + \underline{5} = 6 \\ 5 + \underline{1} = 6 \\ 0 + \underline{6} = 6 \end{array}$$

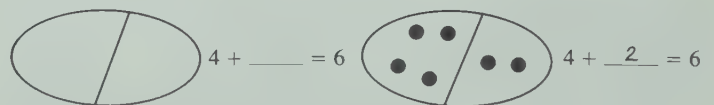
40 (forty)

Writing missing addends, sums to 10

## LESSON ACTIVITY

### Before Using the Page

- Ask six children to stand in front of the other children. Give one bead to each of two of the six children. Write  $2 + \underline{\quad} = 6$  on the chalkboard. Ask how many more beads are needed for each child in the group to have one. Write the numeral to complete the addition sentence. Write other addition sentences with missing addends and have children demonstrate each situation.
- Place a set of seven cutouts on the display board. Ask how many there are in the set. Write the sentence  $3 + \underline{\quad} = 7$  on the chalkboard. Read the addition sentence: "Three plus a certain number is equal to seven." Some children will volunteer the answer at once. Check the response by having a child partition the set so that three cutouts are seen as one group. Have a child complete the addition sentence by writing the numeral for the missing addend. Use other addition sentences for the set of seven. Then repeat the activity for sets of eight, nine, and ten.
- Draw a partitioned set holder on the chalkboard. Write the addition sentence  $4 + \underline{\quad} = 6$  beside the set holder. Have the children use their counters to determine the missing addend.



Some children will start with four counters and count on to six. Some will set out six counters and cover four with their hands. Have a child draw objects in the set holder and complete the addition sentence on the chalkboard. Repeat the procedure for other addition sentences.

### Using the Page

- Read the instruction with the children. Direct the children's attention to the box with the pear in it. Ask how many sections there are in the box. Ask how many pears there are in the box. Ask how many more pears would be needed to fill the box. Have the children trace over the dotted 3. Discuss the second exercise in a similar way. Then let the children complete the two other exercises.

For the six sets of exercises on the second part of the page, show the children how they can use the container with the ten sections for assistance.

## LESSON OUTCOME

Determine the missing second addend in the name for a number to 10

### Materials





display board and cutouts, a sheet of paper for each child, demonstration number line

### Vocabulary

place holder

## RELATED ACTIVITIES

- Prepare a work sheet showing set holders and addition sentences with missing addends. Have the children draw the sets and complete the sentences.

|  |  |
|--|--|
| <br>$1 + \underline{\quad} = 4$ | <br>$3 + \underline{\quad} = 3$ |
| <br>$5 + \underline{\quad} = 8$ | <br>$2 + \underline{\quad} = 7$ |

- Have the children play the game "A Number to Go" described on page T57 for three to six players. The game will give more practice in determining a missing addend for a particular sum.

Complete the names for each number.



|   |  |  |
|---|--|--|
| <p>4</p> $1 + \underline{3}$<br>$2 + \underline{2}$<br>$3 + \underline{1}$<br>$4 + \underline{0}$ | <p>5</p> $2 + \underline{3}$<br>$4 + \underline{1}$<br>$0 + \underline{5}$<br>$3 + \underline{2}$  | <p>8</p> $7 + \underline{1}$<br>$5 + \underline{3}$<br>$2 + \underline{6}$<br>$4 + \underline{4}$  |
| <p>9</p> $4 + \underline{5}$<br>$7 + \underline{2}$<br>$9 + \underline{0}$<br>$3 + \underline{6}$ | <p>10</p> $5 + \underline{5}$<br>$7 + \underline{3}$<br>$9 + \underline{1}$<br>$3 + \underline{7}$ | <p>6</p> $4 + \underline{2}$<br>$1 + \underline{5}$<br>$3 + \underline{3}$<br>$6 + \underline{0}$  |
| <p>9</p> $2 + \underline{7}$<br>$8 + \underline{1}$<br>$6 + \underline{3}$<br>$0 + \underline{9}$ | <p>7</p> $3 + \underline{4}$<br>$5 + \underline{2}$<br>$1 + \underline{6}$<br>$4 + \underline{3}$  | <p>10</p> $8 + \underline{2}$<br>$6 + \underline{4}$<br>$2 + \underline{8}$<br>$1 + \underline{9}$ |

Writing missing addends, sums to 10

(forty-one) 41

## LESSON ACTIVITY

### Before Using the Page

- Give each child a sheet of paper. Place a set of five cutouts on the display board. Show a partitioning to illustrate  $2 + 3$ , for example. Have each child write the addition sentence on the sheet of paper. Change the position of the partition and have the children write the new sentence. Repeat for other sets having up to ten members. Include examples in which zero is an addend.

Write addition sentences in the form  $4 + \underline{\quad} = 8$  on the chalkboard. Have children draw partitioned sets to illustrate the situations and then complete the addition sentences.

- Have the children refer to the number line to determine the missing addends for addition sentences written on the chalkboard. For the sentence  $2 + \underline{\quad} = 5$ , say, "Start at 2. How many steps are needed to reach 5?" For  $3 + \underline{\quad} = 9$ , say, "Start at 3. How many steps are needed to reach 9?" Continue for other addition sentences.
- Conduct an oral drill by using a chart on the chalkboard similar to the one shown. Explain that the circle is called a *place holder*

because it holds the place for the missing number. Point to the first addition phrase and say, "Three plus a certain number equals eight." Have children respond by saying, "Three plus five equals eight." Complete the chart. Repeat the procedure for other sums to 10.

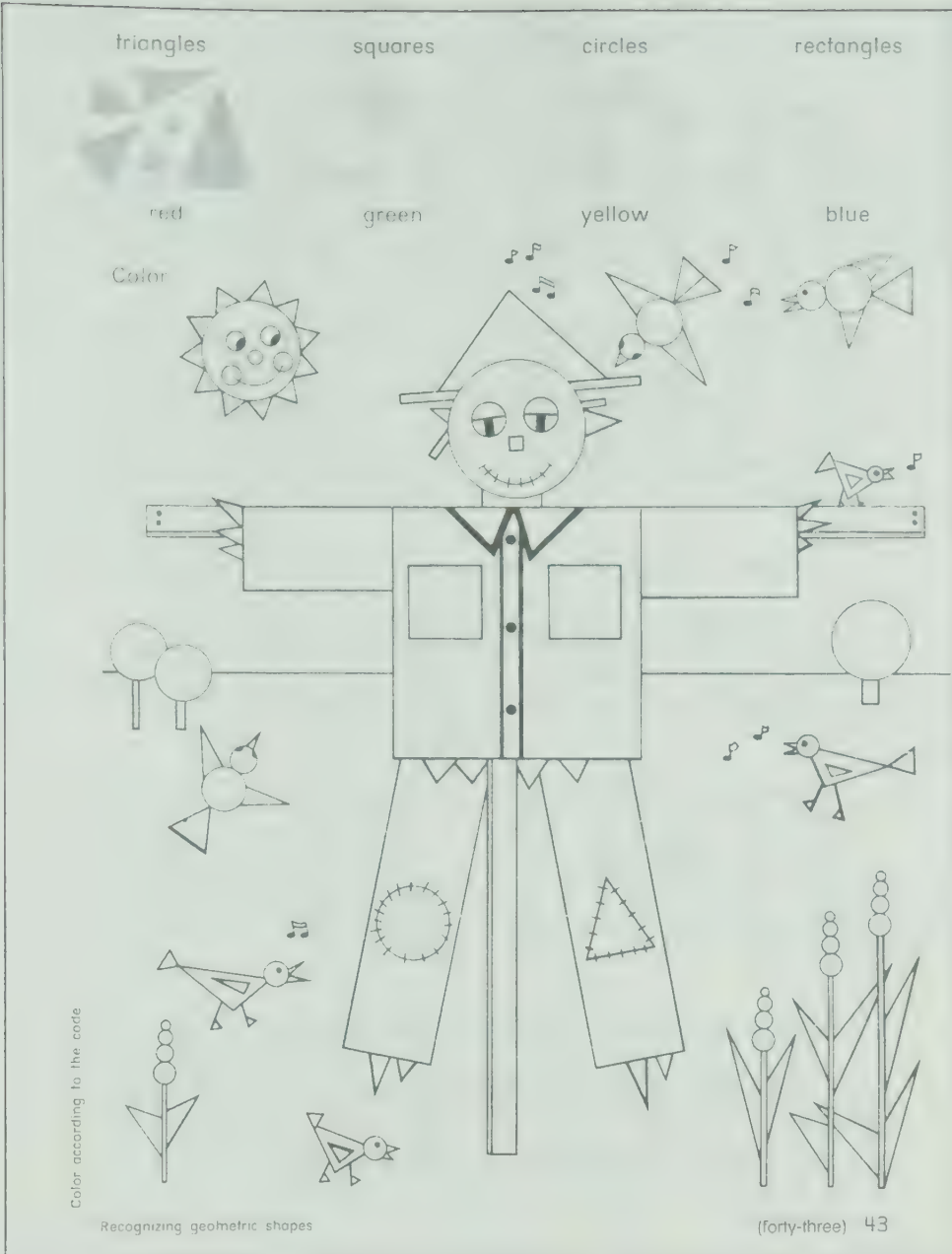
### Using the Page

- Read the instruction with the children. Direct the children's attention to the first shopping bag. Ask what number is shown inside the handle. Say, "One plus a certain number is equal to four. What is the number?" Have the children trace over the dotted 3. Ask a child to make a similar statement for the second addition phrase. Have the children record the number. Then let the children work independently.
- After the children have completed the page, you may wish to refer to a particular sum and have the children state the addition phrases that are not shown for that sum.

|                |
|----------------|
| 8              |
| $3 + \bigcirc$ |
| $0 + \bigcirc$ |
| $1 + \bigcirc$ |
| $6 + \bigcirc$ |



For each exercise in vertical form, have the children ring the two addends that were considered first. Ask them to check their work by adding in the opposite direction.



## LESSON OUTCOME

Recognize basic geometric shapes

## Materials

charts showing circles, rectangles, squares, and triangles, 30 cm of string for each child

## Vocabulary

circle, rectangle, square, triangle, sides

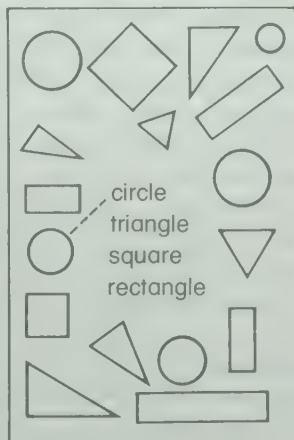
## RELATED ACTIVITIES

- Have the children use geoboards and rubber bands for making designs consisting of square, rectangular, and triangular shapes. You may wish to have the children copy the designs onto copies of page T341 or T342.
- Have the children make a list of items found at home or at school that suggest the shapes of circles, rectangles, squares, and triangles. They may cut pictures from magazines or catalogues to illustrate some of them.

## LESSON ACTIVITY

## Before Using the Page

- Display a chart similar to the one shown. Ask children if they can name any of the shapes on the chart. Have children, in turn, point to a circle, a rectangle, a square, or a triangle. Have someone point to the word *circle*. Have children draw lines connecting circles and the word. Repeat for the other shapes.
- Give each child a piece of string about 30 cm long. Have the children tie a knot in the string to form a loop. Ask them to place the string over their fingers and carry out instructions similar to these:



- “Move one or two fingers to show how you can change the shape of the triangle. How many sides does the triangle have?”

“Make a long, thin triangle.”

“Make a triangle having all its sides about the same length.”

“Use four fingers to show the shape of a rectangle.”

“Make a short, wide rectangle and then a tall, thin rectangle.”

"Make a rectangle having all four sides of the same length.

What special name is there for this shape?"

"Can you make a square of another size with your string?"

"Can you use your fingers and the string to show the shape of a circle? Why not?"

## Using the Page

- Read the words with the children. Discuss the shapes and the color code. Then let the children color as many shapes as they wish, according to the code.



## LESSON OUTCOME

Recognize identical geometric shapes

### Materials

square, circular, triangular, and rectangular shapes of different sizes, display board, other irregular shapes

### Vocabulary

identical (optional), diamond (optional), parallelogram (optional)

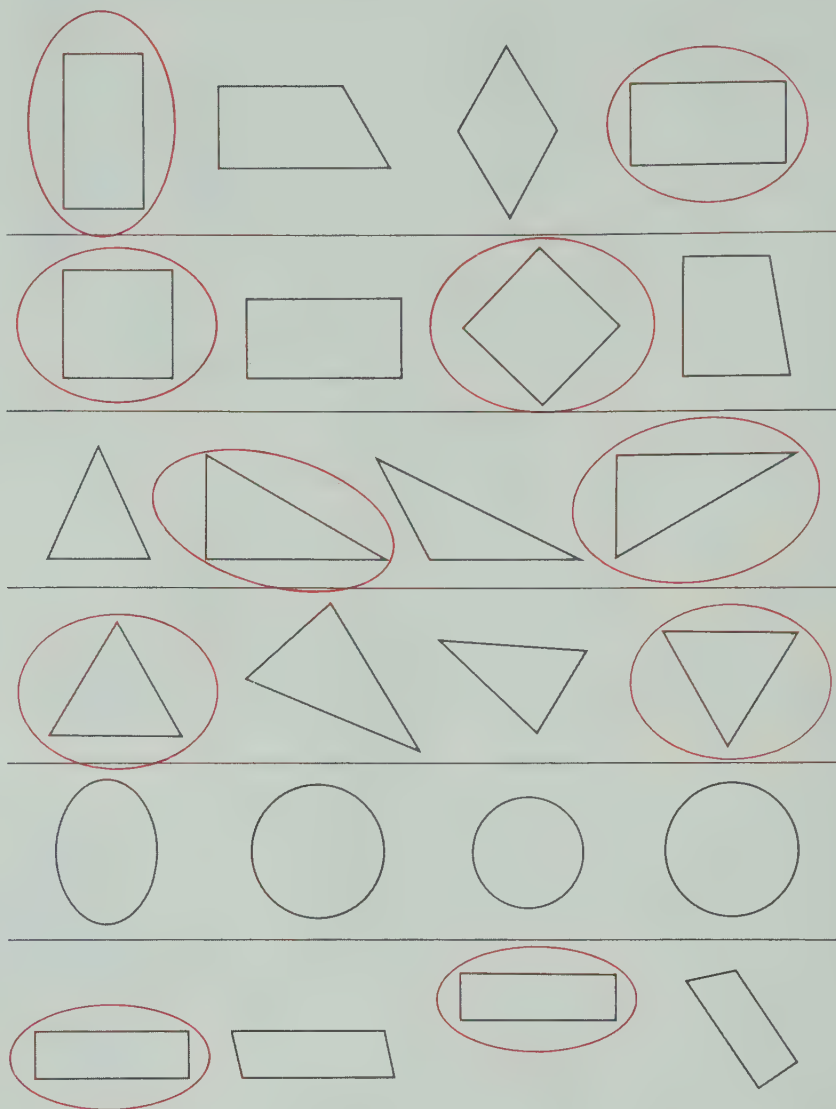
## RELATED ACTIVITIES

- Have the children use attribute blocks or templates for tracing outlines that are of the same shape and size. They may make designs and pictures that consist of the four basic shapes.

Durable templates can be made by scoring shapes on plastic covers of ice-cream containers, margarine tubs, coffee cans, and other containers, and cutting them out with a sharp knife.

- Have the children use straws and pipe cleaners to form models of triangles, rectangles, and squares. Ask them which of the shapes wobble and which do not. Have them use extra straws to make the models of rectangles and squares stable.

Ring the two shapes that match.



44 (forty-four)

Recognizing identical shapes

## LESSON ACTIVITY

### Before Using the Page

- Display several square shapes of different sizes, including several pairs that are of the same size. Have children select two of the shapes that they think are of the same size and demonstrate whether they are correct by placing one shape on top of the other to see if the shapes are identical (same size and shape). You may make the activity more challenging by placing the shapes on the display board so that the positions of the shapes vary, and by using some irregular shapes similar to those shown on the page. Repeat the activity using sets of triangular, circular, and rectangular shapes.

### Using the Page

- Read and discuss the instruction with the children. Have them mark the two shapes in each row that are identical. You may wish to have them trace on a piece of paper one of the two shapes that they think are identical and place it over the other shape to see whether it matches.

- After the children have completed the page, discuss the shapes in each row by asking questions similar to the following:

“Look at the shapes in the first row. Is the second shape a rectangle? Why? Is the third shape a rectangle? Does anyone know a name we could use for the third shape?” (The third shape is a diamond or a rhombus.)

“Look at the shapes in the sixth row. Is the fourth shape a rectangle? Why? Is the second shape a rectangle? Why? Does anyone know a name we could use for the second shape?” (The second shape is a parallelogram.)

- You may wish to review the ordinal number concepts by having the children color according to instructions such as:

“Look at the first row. Color the second shape red.”

“Look at the third row. Color the two triangles that do not match blue.”

“Look at the fourth row. Color the third triangle yellow.”

“Look at the fifth row. Color the small circle green.”

## OBJECTIVE

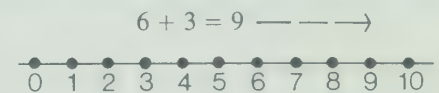
Complete basic addition and subtraction facts, sums to 10 and minuends to 9

## Materials

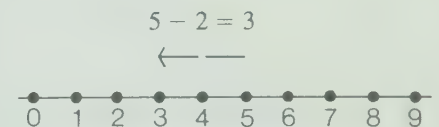
counters or a number line for each child

## RELATED ACTIVITIES

• This would be an ideal time to demonstrate how to use the number line to find sums and differences without having to start at zero for the first number. Draw a number line on the chalkboard and refer to the first number chart on page 45. Point out that the first addend is always 6, thus, the number reached after the first move on the number line is always 6. Suggest that each sum for the chart can be shown by starting at 6 and then moving the appropriate number of steps to the right, as indicated below for the first sum.



Use a similar procedure to demonstrate each subtraction for the second number chart.



You may wish to have the children illustrate other exercises selected from page 45. Provide them with copies of page T331 for this purpose.

## LESSON ACTIVITY

### Before Using the Page

- Name a number less than ten, for example, four. Ask each child to choose one of the numbers from zero to six. Then ask the children to write the addition sentence for the sum of your number and the number they chose. Have as many children as possible read their addition sentence aloud. Repeat the activity for different numbers so that the number you choose and the numbers the children may choose give sums to 10. Let the children use counters or a number line for assistance.
- Adapt the preceding activity so that the children review basic subtraction facts for minuends to 9.
- Draw a number chart on the chalkboard as shown. Explain that each number in the upper row is to be added to 5, and that the sums are to be written as indicated. Point to the 5 and the 2 and say, "What number does five plus two equal?" Have a child print the answer in the chart. Continue until the chart is completed.

|   |   |   |   |   |
|---|---|---|---|---|
| + | 2 | 4 | 3 | 0 |
| 5 | 7 |   |   |   |

- Erase the answers in the addition chart for the previous activity. Erase the symbol + and replace it with the symbol -. Elicit from the children that for this chart, each number in the upper row is to be subtracted from 5, and that the answers are to be written as indicated. Point to the 5 and the 2 and say, "What number does five minus two equal?" Have a child print the answer in the chart. Continue until the chart is completed.

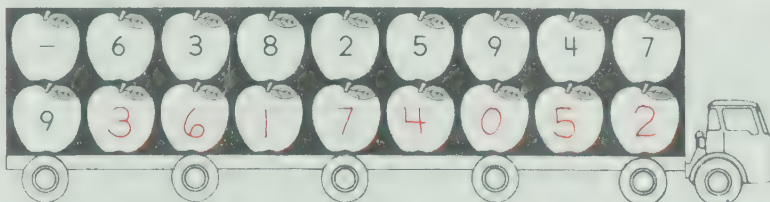
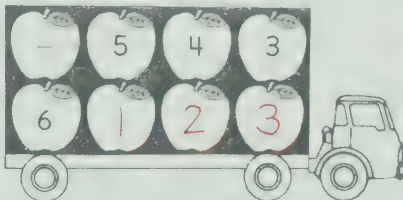
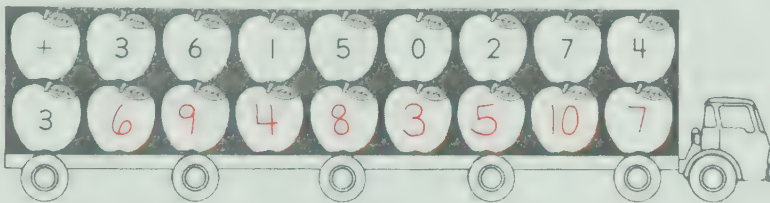
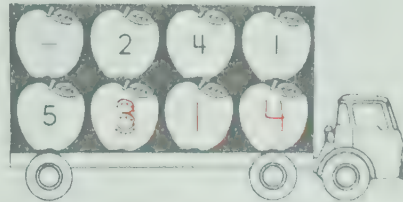
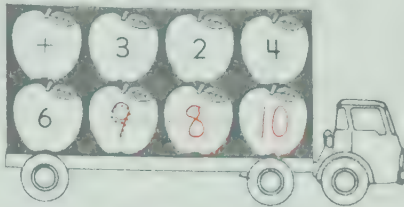
|   |   |   |   |   |
|---|---|---|---|---|
| - | 2 | 4 | 3 | 0 |
| 5 | 3 |   |   |   |

Erase the answers and substitute 8 for the 5. Have children complete the chart as before.

### Using the Page

- Guide the children in completing the first two charts. Then let the children work independently. Caution them to note whether the operation indicated for each chart is addition or subtraction.

Add or subtract.



Addition and subtraction practice sums to 10 minuends to 9

(forty-five) 45



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## RELATED ACTIVITIES

- Have the children use skipping ropes in the gym to practise skip counting by twos to 20. For the first jump have them say the number silently and for the following jump say the number aloud. For example,

|        |         |
|--------|---------|
| (jump) | "one"   |
| "two"  | (jump)  |
| (jump) | "three" |
| "four" | (jump)  |
| (jump) | "five"  |
| "six"  | (jump)  |

- Have the children play the game "Throw a Row" described on page T57.

Subtract.

$$4 - 2 = \underline{2}$$

$$9 - 5 = \underline{4}$$

$$\begin{array}{r} 7 \\ -6 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 3 \\ -3 \\ \hline 0 \end{array}$$

$$8 - 3 = \underline{5}$$

$$6 - 2 = \underline{4}$$

$$9 - 7 = \underline{2}$$

$$5 - 1 = \underline{4}$$

Add.

$$7 + 3 = \underline{10}$$

$$4 + 6 = \underline{10}$$

$$\begin{array}{r} 2 \\ 3 \\ +3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 2 \\ 2 \\ +6 \\ \hline 10 \end{array}$$

$$4 + 5 = \underline{9}$$

$$9 + 1 = \underline{10}$$

$$2 + 3 + 4 = \underline{9}$$

$$5 + 1 + 2 = \underline{8}$$

Complete.

|    |    |           |           |           |           |           |           |           |
|----|----|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 10 | 11 | 12        | <u>13</u> | <u>14</u> | <u>15</u> | <u>16</u> | <u>17</u> | <u>18</u> |
| 20 | 19 | <u>18</u> | 17        | <u>16</u> | <u>15</u> | <u>14</u> | <u>13</u> | <u>12</u> |
| 2  | 4  | 6         | <u>8</u>  | <u>10</u> | <u>12</u> | <u>14</u> | <u>16</u> | <u>18</u> |

Complete.

$$5 + \underline{2} = 7$$

$$4 + \underline{2} = 6$$

$$3 + \underline{6} = 9$$

$$1 + \underline{3} = 4$$

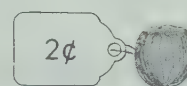
$$3 + \underline{2} = 5$$

$$4 + \underline{4} = 8$$

I have

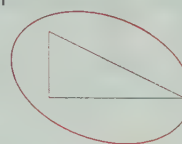
I buy

I have left



2 ¢

Ring the triangle. Check the square.



46 (forty-six)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- Review the work of this unit by using several of the following activities:

- Review orally the addition facts having sums to 10 and the subtraction facts having minuends to 9.
- Rote count from 1 to 20 and from 20 to 1.
- Start at a number and count on to another number.
- Start at a number and count on for so many more to find the number reached.
- Start at a number and count back for so many to find the number reached.
- Start at a number and count by twos to another number. (Refer to the number line if necessary.)
- Ask questions of the following type: "Five plus a certain number is equal to seven. What is the number?"
- Refer to page 29 and review how to find the total cost and the amount left.

- Review addition with three addends using the horizontal and vertical forms. Add in one direction and then add in the opposite direction for checking the answer.

- Review the names of the four basic geometric shapes and characteristics of each shape.

### Using the Page

- Draw attention to the word *Checkup* at the bottom of the page. Review that this page helps children to determine their understanding of the work of this unit. Read each instruction in turn or, where possible, have a child read it. Discuss with the children how they are to proceed on the page, and then let them work independently.

## Games and Activities

### Concentration (Game for page 30)

#### Materials

one set of red cards for the numerals 10 to 20  
one set of blue cards for the words *ten* to *twenty*

#### Rules

1. The cards are shuffled and placed face down in an array in front of the players.
2. The first player turns over one red card and one blue card. If the numeral and the word are names for the same number, the player keeps the cards and has another turn.
3. If the cards do not name the same number, they are turned face down again in their original positions and the next player has a turn.
4. The player having the most cards at the end of the game is the winner.

### Road Race (Game for page 31)

#### Materials

a game board on a strip of cardboard marked as shown  
one marker for each player (toy car, airplane, farm animal)  
a spinner with the numerals 0, 1, 2, 3 in black and the numerals 0, 1, 2, 3 in red

|              |
|--------------|
| 20           |
| 19           |
| 18           |
| 17           |
| 16           |
| 15           |
| 14           |
| 13           |
| 12           |
| 11           |
| 10           |
| 9            |
| 8            |
| 7            |
| 6            |
| 5            |
| 4            |
| 3            |
| 2            |
| 1            |
| 0      START |
| 1            |
| 2            |
| 3            |
| 4            |
| 5            |

#### Rules

1. The players place their markers on START. A player can move from the starting position only when the pointer on the spinner indicates a black numeral. The player then moves her/his marker ahead that number of spaces.
2. After all the players have left the starting position, they move forward when a black numeral is indicated and backward for a red numeral.
3. The player who reaches 20 first is the winner.

Because the numbers extend backward beyond zero, a player can go in the "hole". This provides an incidental experience with negative numbers.

### A Number to Go (Game for page 41)

#### Materials

four sets of cards for the numbers from 0 to 10 (44 cards)

#### Rules

1. Each player is dealt the same number of cards, from four to ten.
2. The first player places one card from her/his hand face up on the table, decides on a number, and states, "I want a number to go with my (4) to make (9)."
3. A player who has a card for (5) may place it on the table and say, "Here is a (5) to go with your (4) to make (9)." This player then places another card on the table and states a new problem.
4. If no player has a card to satisfy the request made, the player returns the card to her/his hand and the next player has a turn.
5. The game continues until one player having no cards left is declared the winner.

### Throw a Row (Game for page 46)

#### Materials

a game board for each pair of players, as shown  
15 red markers and 15 blue markers for each pair of players  
a die marked 0, 1, 2, 3, 4, 4  
a die marked 1, 2, 3, 4, 5, 6

|   |   |    |    |   |
|---|---|----|----|---|
| 2 | 1 | 3  | 10 | 5 |
| 6 | 9 | 2  | 8  | 1 |
| 4 | 8 | 7  | 7  | 6 |
| 7 | 3 | 6  | 10 | 9 |
| 8 | 6 | 10 | 4  | 9 |

#### Rules

1. Each player uses one set of colored markers.
2. The two players take turns rolling the dice.
3. Each player places a marker on the number for the sum of the numbers rolled.
4. The player who first has three markers in a row (horizontally, vertically, or diagonally) is the winner.

A variation of this game is for each player to have her/his own game board and 25 markers. The player who first covers the board with markers is the winner.



## Unit 3 Overview

In this unit, subtraction facts are extended to include those having minuends to 10 and practice exercises are provided for both addition and subtraction facts. Addition and subtraction facts, such as  $6 + 2 = 8$  and  $8 - 2 = 6$ , and  $2 + 6 = 8$  and  $8 - 6 = 2$ , are presented as sets of related facts, and children acquire an informal understanding of the commutative property of addition and the inverse relationship between the two operations. Place values in two-digit numerals are studied and children complete exercises in writing and interpreting numerals showing tens and ones. Counting by tens is strengthened by the introduction of the dime and the number names *ten* to *ninety* are presented. The concept *one-half* is applied to whole objects and to shapes, as well as to sets of objects. The former leads to the development of the concept *line symmetry*, in which two parts of a shape match but are reversed in position. Temperatures above zero on the Celsius scale are read as an introduction to this type of measurement. Problem-solving skills are developed in two of the lessons. The first lesson in the unit requires finding a safe path through a maze. This type of challenge suggests that in solving many real problems choices must be made frequently from among several alternatives. This is followed by another lesson that uses illustrations and a minimum of words to present simple problems the solutions of which require the use of either addition or subtraction. These operations are also applied to amounts of money to 10 cents. The *Checkup* at the end of the unit provides an assessment of the children's understanding and use of the concepts and skills presented in the lessons.

## Unit Outcomes

### Number

- complete subtraction sentences for minuends of 10
- complete basic subtraction facts, minuends to 10
- determine the missing first addend in an addition sentence, sums to 10
- write a number sentence for a story problem and answer the question of the problem
- recognize one-half of a whole; use the symbol  $\frac{1}{2}$
- distinguish between sets that show one-half and those that do not; identify one-half of a set
- add and subtract amounts of money, to 10 cents
- identify sets of tens from 1 ten to 9 tens; write the numerals for tens from 10 to 90
- count by tens to 90 using dimes
- identify a set of tens and a set of ones and write the corresponding two-place numeral, numbers from 10 to 50
- interpret related addition and subtraction situations
- complete related addition and subtraction facts, sums to 10
- complete basic addition and subtraction facts, sums and minuends to 10

### Measurement

- read temperatures above zero on a Celsius scale

### Geometry

- identify symmetrical shapes
- show a line of symmetry on a shape

### Logic

- choose alternatives in a problem situation

## Background

**Number:** The concept of a missing addend was introduced in Unit 2 with the second addend missing in an addition sentence. In this unit the missing addend is the first one. When the sum and one addend are known, there are different ways of finding the missing addend. Sometimes the entire addition sentence is recalled from the parts given. If objects are used to determine the missing addend, the known part (subset) can be separated from the whole set to reveal the unknown part. This process identifies two subsets from which either addition facts or subtraction facts can be formed. For example, if a group of five is separated from a set of eight, a group of three is identified. By this method the following four number sentences can be completed.

$$\begin{array}{rcl} \underline{\hspace{1cm}} + 5 = 8 & & 3 + \underline{\hspace{1cm}} = 8 \\ 8 - 5 = \underline{\hspace{1cm}} & & 8 - 3 = \underline{\hspace{1cm}} \end{array}$$

The inverse relationship between addition and subtraction is developed more formally toward the end of the unit. Standing up and sitting down, and opening and shutting a door are examples of an operation and its inverse. Sometimes these are described as “doing” and “undoing” operations, since the second operation “undoes” the effect of the first. Of course, the order of the two might be reversed; for example, shutting a door and then opening it would be equally valid as “doing” and “undoing” operations. Similarly, addition and subtraction are inverse operations, regardless of which comes first. The concept of “doing” should be associated with the first operation, whether it is addition or subtraction.

The inverse relationship between addition and subtraction makes it possible to organize basic number facts into sets. For unequal addends there are four related addition and subtraction facts, and for addends that are equal there are two related facts.

$$\begin{array}{rcl} 3 + 6 = 9, 6 + 3 = 9 & & 4 + 4 = 8 \\ 9 - 6 = 3, 9 - 3 = 6 & & 8 - 4 = 4 \end{array}$$

It is important that children become familiar with the number ten and multiples of ten and that they learn to record and interpret the numerals 10, 20, 30, and so on, to 90 in terms of the number of tens they represent. Counting by tens can be used to emphasize these numbers. Counting by ones includes all the whole numbers, and therefore any number greater than nine can be interpreted as tens and ones. This is the beginning of place value, which is so important in the development of number concepts and operations. Without an understanding and appreciation of place value, some children might not see any significant difference between such numerals as 38 and 83.

Since the children have been working with number sentences in addition and subtraction, they may now see how number sentences can be used to solve problems in real or lifelike situations. It is important that they have many experiences in joining sets and writing the related addition sentences, and also in removing members of sets and writing the related subtraction sentences. It is from the actual joining and separating that children derive a “feeling” for addition and subtraction. Identification of the correct operation is probably the most crucial of all the steps in solving problems.

Problem situations that children encounter in their own activities are real. They know whether the action is one of joining or separating. Word problems are not real; and for these the children must first interpret the words, and then visualize the situations. This involves reading skills that the children may or may not have. Some may lack the necessary reading skills, but

they need not be denied the experience of solving mathematical problems. Thus, it may be necessary for you to state the problems orally.

When an object is divided into two parts and the parts obtained are equal, they are called *halves*. Understanding fraction concepts depends on a realization that the parts must be equal. For the activities suggested in *Before Using the Page* the children use objects and shapes that can be divided easily into two equal parts. By folding along a line, two halves of a regular shape can be shown.

Finding one-half of a set provides an informal approach to division. The children are given the opportunity to solve problems such as finding how many objects each of two persons will receive if there are up to 18 items being shared. No formal presentation of division is made at this time, but sharing between two and finding one-half of a set serve as interesting forerunners of the operation.

**Measurement:** The words *warm* and *cold* are indefinite ways of describing temperatures since no definite base is established from which to make comparisons. The temperature in a house may be described as being cold, while the same temperature outdoors may be considered to be quite warm. *Warmer* and *colder* are less ambiguous because one temperature is the base for comparing the other. The most reliable method of indicating temperature is by a thermometer on which a scale of degrees is printed above and below the freezing point of water. This point is zero on the Celsius scale. Only temperatures above zero are discussed in this unit. Temperatures below zero are presented in Unit 5.

**Geometry:** Paper folding used in connection with the fraction concept *one-half* may also be used to develop line symmetry. A shape that shows two matching halves, one on each side of a line, has line symmetry. Some shapes have more than one line of symmetry. For example, a square can be folded vertically, horizontally, and diagonally. A rectangle can show line symmetry if it is folded vertically or horizontally, but not if it is folded diagonally. Regular hexagons have several lines of symmetry. Circles have an unlimited number of lines of symmetry.

## Teaching Strategies

The skills required for tracing a path through the maze on page 47 are different from the skills associated with numbers. Some children will do surprisingly well, while others will experience difficulties. If other similar games and activities are provided for further practice and follow-up, it may be desirable to group children according to their interests.

It is recommended that the teacher initiate the practice of recording children's individual weaknesses in basic addition and subtraction facts. Mastery, or instant response, is required for success in higher levels of computation and achieving this level of competence should be a goal of the children as well as the teacher. Children with similar weaknesses should be grouped for reteaching, review, and practice. It is suggested that these activities stress "families" of related facts, as shown in *Background (Number)* for this unit.

Work sheets showing subtraction or addition exercises may be given to the children every third or fourth day. If the tests are timed for one minute, each child may try to improve her/his previous score.

Children who have difficulty reading and comprehending word problems can usually solve simple oral problems, and thereby gradually acquire the ability and confidence to deal with word problems as presented on the pages. If a tape cassette is prepared of the word problems on page 51 and other pages of the book, children can listen and read at the same time, and decide on a method of solution. Sometimes the use of objects may be necessary to illustrate situations described.

Irregular as well as regular shapes should be provided in dealing with one-half of an object and with line symmetry, so that the children may identify shapes that do not represent halves, as well as those that do.

## Materials

simple maze for demonstration  
demonstration number line, individual number lines  
magazines and catalogues, scissors, paste  
a work sheet showing ten-strips for each child  
display board and cutouts, yarn or string for set holders  
pocket chart as described on page T38  
dominoes with dot patterns or numerals to 10  
dice for 10, 9, 8, 7, 6, 5, and 0, 1, 2, 3, 4, 5  
marbles, beads, other kinds of counters for sets of 10  
a box or a paper bag  
objects to be cut into halves (apples, oranges, ribbon, paper strips)  
sheets of paper in various shapes for showing halves  
Plasticine  
three drawings of a pear cut into two parts  
real money, play money, or coin cutouts from copies of page T327  
play store or store chart  
objects for grouping by tens (straws, sticks, pegs, record centres), trays  
fasteners (string, rubber bands, twist ties, pipe cleaners)  
cards showing the words *ten* to *ninety* and the numerals 10 to 90  
objects or pictures of objects without price tags and others with tags showing prices for multiples of ten to 90¢  
number board labelled for displaying tens and ones  
pictures of symmetrical things in nature, cutouts of capital letters  
cutouts of paper dolls, sheets of paper, circular filter paper, graph paper  
ten counters for each child  
demonstration thermometer (See page T83.)

## Vocabulary

|                    |                    |
|--------------------|--------------------|
| maze               | sixty              |
| hexagon (optional) | seventy            |
| one-half           | eighty             |
| halves             | ninety             |
| dime               | number names to 50 |
| change             | ones' place        |
| left               | tens' place        |
| right              | line of symmetry   |
| tens               | thermometer        |
| ten                | temperature        |
| twenty             | warmer             |
| thirty             | colder             |
| forty              | degrees            |
| fifty              | Celsius            |



## Unit 3 Theme – Wildlife

The purpose of this theme is to help the children clarify and confirm their knowledge of wildlife and then extend this knowledge with new information. It is hoped that the children will appreciate the place of wildlife in the environment and develop an awareness of the necessity of protecting that environment. It is also hoped that the children will gain some insight into the wildlife unique to the various parts of Canada.

Create a background of colored photographs or pictures of various forms of wildlife. Display an assortment of books that will provide information on the habitats, the eating habits, and the appearance of wild creatures. The Ministry of the Environment in each province may be able to supply informational booklets. Plastic models of animals are available in the toy departments of many large stores. These models can be used for studying the characteristics of each animal and also for activities involving classification. Include the children's work from the suggested activities as they are completed.

### LANGUAGE ACTIVITIES

#### 1. Discussing Wildlife

Ask each child to make a list of the names of all the animals he/she can think of. Compile these names into one list for the whole class. Try to include the names of between twenty and thirty animals.

By questioning, establish that some of the animals listed are pets. Record the names of these animals on a chart labelled "Pets".

Again, by questioning, establish that some of the animals listed are farm animals. Record the names of these animals on another chart labelled "Farm Animals".

Ask the children how they would refer to the remaining group of animals. If the children do not think of the term *wildlife*, suggest it to them. Discuss the characteristics of animals belonging to this group. The children may suggest habits and habitats peculiar to wildlife. Use this information to develop a chart story about wildlife.

Point out that so far only the names of animals appear in the list labelled "Wildlife". Refer to the definition of *wildlife* suggested by the children. Encourage them to suggest other forms of life that belong on the list.

Refer to the list daily and include the names of new animals, birds, or fish that the children have been able to suggest.

Read the book *Did you Ever See?* by Walter Einsel (Addison-Wesley Publishing Company) to the children. Select the rhymes that refer to wildlife, for example, "Have you ever seen a giraffe – laugh?" Discuss the imagery of the rhymes.

From the chart, select the names of animals that are not mentioned in the book. Have the children make up their own rhymes for each of these animals and illustrate them.

A lion can run  
And a lion can roar.  
But a lion can't shop  
At a grocery store.

Compile these rhymes into a class book. Include this book in the wildlife display.

#### 2. Wildlife Chains

Have children arrange the names of animals, birds, and fish so that the last letter of each word is the same as the first letter in the next word. For example, the first three words in the chain might be *zebra*, *anteater*, *rabbit*. Try to include all the names from the list of wildlife.

#### 3. Habitat Concentration

Prepare fourteen cards measuring 10 cm by 6 cm. Print one of the following words on each of seven cards: *fox*, *snake*, *squirrel*, *deer*, *beaver*, *mole*, *mouse*. Print one of the following words on each of the remaining seven cards: *den*, *grass*, *tree*, *woods*, *lake*, *underground*, *nest*.

Start the game by placing all the cards face down. The first player turns over two cards. If the animals and the habitat match, the player keeps the cards. If they do not match, the cards are turned face down again and the next player turns over two cards. The game continues until all the cards have been claimed. The player having the most cards is declared the winner.

### MATHEMATICS ACTIVITIES

#### 1. Graphing

Prepare the headings "Animals", "Birds", and "Fish" for a horizontal bar graph. Refer to the list of wildlife prepared for Language Activity 1. Consider each name on the list and color inside a square of the appropriate bar. After the graph has been completed, have the children answer questions based on the information shown by the graph.

#### 2. Animal Stories

Provide pictures of a number of animals or birds that suggest joining and separating situations. Have the children interpret the situations and suggest an addition sentence or a subtraction sentence that describes each situation. For example, "Four deer were drinking at a stream. Three more deer came to drink. Then there were seven deer at the stream. Four plus three is seven."

Have the children cut pictures of animals from magazines and paste them on cards to illustrate joining and separating situations. If the corresponding number sentence is written on the back of each card, the children will be able to check their own work as they write the number sentences.

#### 3. Wildlife in the Classroom

To give the children first-hand knowledge of caring for an animal, you may wish to keep a gerbil or a hamster in the classroom for several months. The children will gain knowledge from handling the animal, observing its eating and sleeping habits, and watching its behavior under various conditions.

The day-to-day activities involved in caring for the animal lead to problem-solving situations and practical applications of mathematics as suggested in the following activities.

1. Let the children measure the length and the mass of the animal twice each week on, say, Mondays and Thursdays for one or two months. Have them record the information on a chart. This information can be shown on graphs, which will indicate whether the growth of the animal was regular or irregular.

2. Let the children find the mass of the animal before and after feeding. Have them record the information on a chart. Later this information can be shown on a graph so that the children will be able to see the growth of the animal in relation to the amount of food consumed.
3. Encourage the children to provide different foods for the animal to eat. The foods can be listed under the following headings: "Foods Liked Best", "Foods Accepted", and "Foods Ignored". Discuss with the children the results of their investigations.

Children may be interested in conducting other experiments with the animal; for example, how fast it can run a given distance, or how far it can run in a given time.

## SCIENCE ACTIVITIES

### 1. Classifying Wildlife

Make a set of about twenty picture cards of animals, birds, and fish. Prepare a chart board showing three columns labelled "Air", "Land", and "Water". A child must place a picture card in the column where the creature is most likely to be found. Challenge the children with these questions:

- "Were fish the only creatures found in water?"
- "Which creatures are found in two places?"
- "Was any creature found in the three places?"
- "Can any of the groups be divided into other groups? Name the groups."
- "What other ways can you think of for sorting all the pictures?"

### 2. Bird Feeder

Children who live in city apartment buildings need not be deprived of the pleasure of watching birds at a bird feeder.

A simple bird feeder can be made from a small log or a large pine cone into the grooves of which fat cut from cooked meat or fat drippings is pushed with a knife. For an extra treat the log or pine cone can be rolled in a layer of bird seed spread on a tray. A piece of strong cord can be tied around the log or the pine cone to make a hanger for attaching the bird feeder to a balcony.

Encourage the children to learn to identify and report the different kinds of birds that come to their bird feeders.

## SOCIAL STUDIES ACTIVITIES

### 1. Forest Safety

Many creatures make their homes in the forest where they know how to find food and shelter. People do not often live in a forest so there are things to keep in mind for protecting oneself when visiting a forest. Discuss these ideas with the children. Establish a list of safe practices when walking in the woods or visiting a forest. The children may make suggestions similar to the following:

- a. Walk sideways down a steep hill to keep from falling.
- b. Do not throw sticks or stones.
- c. Stay on a trail or path.
- d. Stay within a safe distance from the edge of a cliff or steep bank.
- e. If you become lost, stay in one place until help comes.
- f. Don't pick or eat berries from unfamiliar plants.

Besides keeping ourselves safe in the forest, there are things we can do to keep the forest safe for wildlife. Make a list of suggestions offered by the children and discuss each idea. The children may make suggestions similar to the following:

- a. Don't pick wild flowers or peel bark from trees.
- b. Make sure campfires are soaked with water before you leave them.
- c. Remind adults to be careful with cigarettes and matches.
- d. Don't throw away refuse. Save it until you find a waste container.
- e. Don't remove birds' nests or throw things into burrows.

Some people have special jobs of keeping streams and forests safe for both wildlife and people. Suggest some of these occupations and their purposes. If possible, have a worker in one of these occupations visit the classroom, for example, a forest ranger.

You may wish to complete this activity with one or more of the following:

- a. Have each child make a book on forest safety, illustrating each rule.
- b. Make a class mural showing a forest before, during, and after a fire.
- c. Make a class book of occupations concerned with forest safety.

### 2. Canadian Wildlife

Refer to the list of wildlife prepared for Language Activity 1. Mark each creature that is found in Canada. On a large map of Canada, locate and mark the habitats of the different creatures. Divide the class into six groups and present one of the following challenges to each group. The children may record their comments individually or as a group.

Tell about the wildlife that is found in each of the following locations:

- a. very cold regions.
- b. mountainous regions
- c. the forests
- d. the prairies
- e. near your home
- f. everywhere in Canada.

Plan a sharing time so that the children can read and discuss their reports.

### 3. Wildlife Clues

Depending on where your school is located, you may wish to take the children on a field trip to find signs and tracks of animals that have been in the vicinity. You may choose to visit woods and fields, the seashore, a pond or a stream, or a park. If the children learn to spot certain signs, they will get more pleasure from a camping trip, a hike, or just a walk through a park.

#### Signs

It is easier to see signs in winter, but in the other seasons there are more animals around and thus more signs.

Before you leave on a trip discuss with the children signs that they should look for. If you are going to visit woods and fields, the following are some of the simplest signs:

- a. remnants of nuts, pine cones, and other seeds and fruits
- b. a pile of shells from nuts or seeds on a log
- c. gnawed twigs
- d. bushes or small trees with their tops bitten off
- e. bark on trees gnawed in small strips
- f. large pieces of bark torn off branches and trunks of trees
- g. holes with large openings high in hollow trees
- h. small holes in the trunks of trees
- i. depressed and matted grass or stalks
- j. animal droppings



- k. tufts of fur caught on branches or trunks of trees
- l. a pile of feathers or the carcass of a bird
- m. white stains of bird droppings
- n. egg shells thrown from a nest
- o. mounds of earth that suggest tunnels

### Tracks

Animals leave tracks wherever they walk—on leaves, in mud, on sand, or in snow. Tracks vary in size because of the surface on which they are made and the speed at which the animals were moving. This makes it difficult to identify tracks. Often children find it sufficiently exciting to see that “someone was here”. If you do see some tracks, they are likely to be those made by a squirrel, a rabbit, a skunk, or a raccoon.

Animals that live mainly in trees (squirrels and raccoons) place their feet side by side when bounding on the ground. The hind feet strike the ground after the front feet. The prints of the hind feet are located ahead of those of the front feet.

Animals that live on the ground (rabbits and skunks) place their front feet diagonally, one ahead of the other, at each bound. The hind feet of these animals also hit the ground ahead of the marks left by the front feet.

Prepare several copies of tracks made by these four animals for the children to refer to when trying to identify tracks.

Perhaps the easiest place to identify tracks is at the seashore, where it may be possible to find the tracks of birds.

When you go on your trip, be sure to take one or more books to help identify tracks, a magnifying glass to show greater detail in a specimen, a pair of binoculars to make it possible to observe inaccessible objects, and a tape recorder to record bird songs and calls. You may wish to record alarm calls that warn other creatures of danger; for instance, a rabbit may stamp its feet or a squirrel may chatter noisily. Each child should be equipped with a small notebook, a pencil, and a ruler if measurements are to be made.

## 4. Wildlife as a Source of Food

Long ago, people depended on wildlife for food. Since there were no supermarkets, electric stoves, or refrigerators, discuss how meat was obtained, cooked, and stored.

We still depend on one aspect of wildlife for our daily needs. Commercial fishing enterprises supply fish, shellfish, and seafood from the oceans and lakes. Discuss the fishing methods used for various types of fish. If possible, visit a fish market or the fish counter in a supermarket and identify the fish available for food. Provide samples of canned fish or cook frozen fish so that the children may compare the tastes of such things as mackerel, sardines, tuna, salmon, clams, mussels, oysters, shrimp, and scallops.

## ART ACTIVITIES

### 1. A Forest Scene

Use the top of a table for depicting a forest scene. Make trees by rolling construction paper into tubes and fastening each tube with tape. Slash the top of each tube and gently curl the fringes to suggest the foliage of a tree. Ask each child to choose a favorite forest animal and a sheet of construction paper. Have each child fold the paper in half and draw the animal so that its head and part of its body are on the fold. When each animal is cut out, it will stand up. The children may use paint or crayons to show distinctive markings on the animal. Place these animals in their forest habitat.

## 2. Wildlife on Canadian Stamps

The children in your class may be interested in collecting Canadian stamps on which wildlife is illustrated. The first such stamp was issued in 1851 and depicted the beaver. The next stamp to show wildlife was issued in 1946 and depicted the Canada goose. Since then there have been many beautiful stamps issued in the categories of animals, birds, and fish. The children may wish to collect stamps for the three categories, or they may prefer to concentrate only on stamps illustrating animals.

## MOVEMENT ACTIVITIES

### 1. Animal Movements

Read the following poem to the children. Pause at the end of each verse and ask the children to guess what animal the poem is about.

#### WHISKY FRISKY

Whisky Frisky  
Hipperty hop,  
Up he goes  
To the tree top!

Whirly, twirly,  
Round and round,  
Down he scampers  
To the ground.

Furly, curly,  
What a tail,  
Tall as a feather  
Broad as a sail.

Where's his supper?  
In the shell.  
Snappy, cracky,  
Out it fell.

*Author Unknown*

Read the poem again slowly and have the children imitate the busy movements of the squirrel.

Ask the children to think of words to describe the movements of other animals, for example, a bear, a rabbit, a snake. Have the children move in ways to illustrate these descriptive words.

Discuss the characteristics of the movements of animals in various situations, for example, frightened animals or stalking animals. Have the children pretend to be animals in each situation and move accordingly.

### 2. Movement in Media

Divide the children into three groups. Ask those in one group to move as if they were creatures of the air, those in the second group to move as if they were land creatures, and those in the third group to move as if they were water creatures.

## MUSIC ACTIVITIES

### 1. Animal Sounds

Show one or more films of wildlife in which there are the sounds and calls of animals and birds. After the children are familiar with the sounds, make a tape recording of animal and bird sounds. Prepare pictures of the animals and the birds that make these sounds. As the tape is played, have the children identify each animal or bird from the sound.

## LESSON OUTCOME

Choose alternatives in a problem situation

## Materials

simple maze for demonstration

## Vocabulary

maze

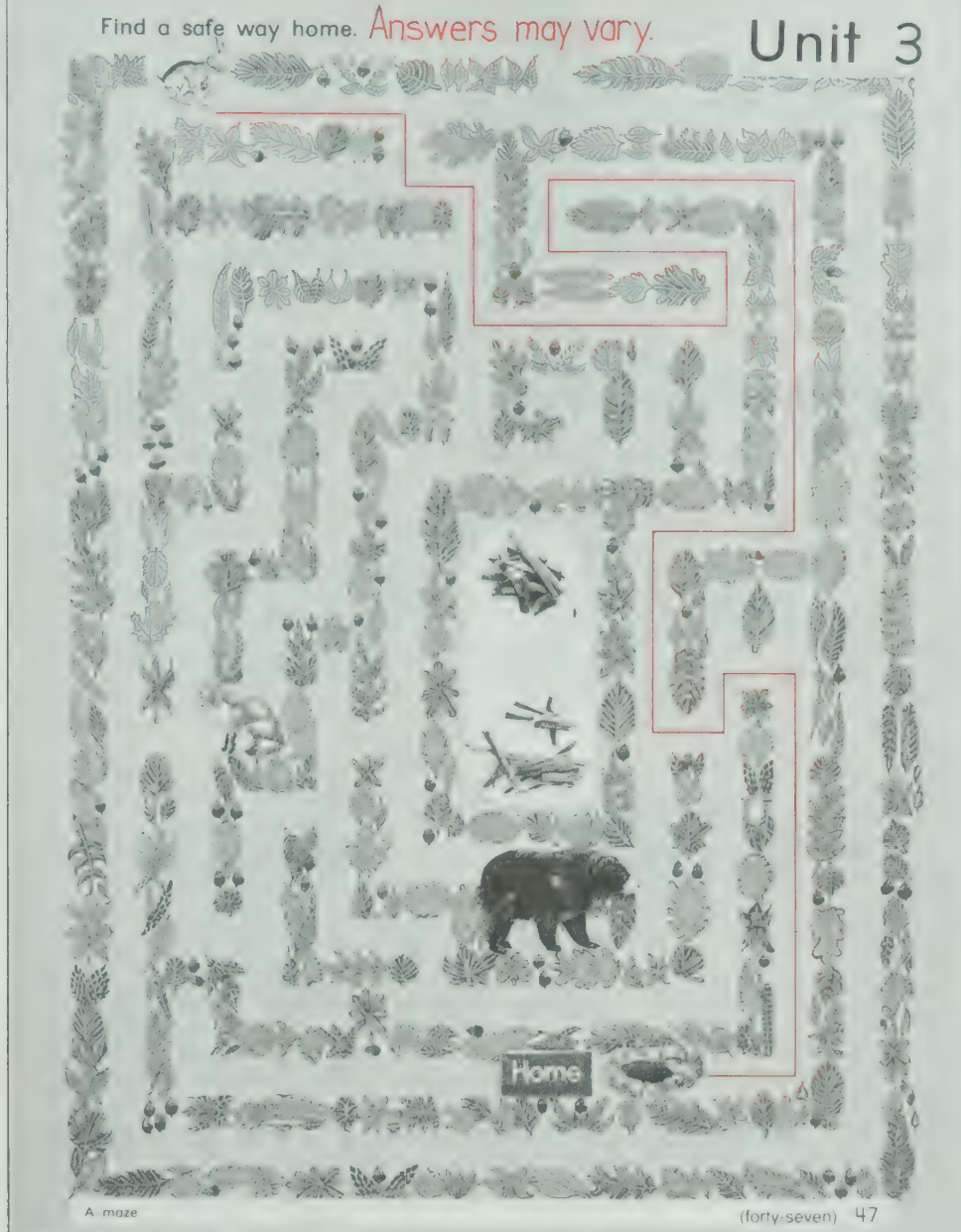
## RELATED ACTIVITIES

- Have the children play the game "A-Mazing" in small groups. For each group you will need a copy of the maze on page T83, one die marked 4, 5, 6, 7, 8, 9, and a marker for each player.

Place all the markers at the entrance to the maze. Players take turns tossing the die and moving that number of squares to find a path through the maze. More than one marker may land on the same square. The thick lines may not be crossed. The first player to reach the exit is the winner.

- Some children will enjoy playing the game "Tick-Tack-Toe" (X's and O's). Variations of this game are given on page T83.

- Children who have difficulty with hand-and-eye co-ordination will benefit from working with simple mazes that are found in books of games and puzzles.

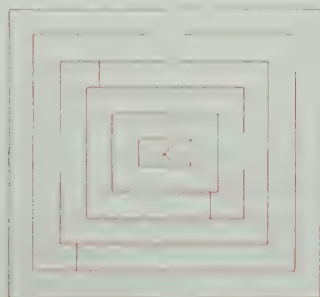


## LESSON ACTIVITY

## Before Using the Page

- Children should be encouraged to think and reason for themselves. Not only in the area of problem solving are reasoning skills helpful, but also in many other aspects of the school curriculum. Encourage the children in your class to make decisions and to be independent in the classroom. If children are encouraged to be independent, their confidence in themselves is increased and they are better prepared to deal with the real world.

On the chalkboard, draw a simple maze like the one shown.



Show the children that in trying to get to the centre of the maze, a path is often blocked and another route has to be chosen. Have several children try to trace a path to the centre of the maze.

## Using the Page

- Read the instruction to the children. Tell them that the rabbit wishes to find a safe path to its home. Discuss the animals shown and the reasons for not taking certain paths. Have the children put one finger on the page where the rabbit is shown and trace a path that is safe. When they have found such a path, have them mark it with their pencils. Suggest to the children that they find an alternative path and mark it in a different color. Discuss that a safe path may also be found by starting at the rabbit's home and tracing a path back to the rabbit's starting position.



## LESSON OUTCOME

Complete subtraction sentences for minuends of 10

### Materials

number line on the floor or chalk-board, individual number lines, magazines or catalogues, scissors, paste, sheets of paper, a work sheet showing ten-strips for each child, display board and cutouts

## RELATED ACTIVITIES

- Draw the children's attention to the first completed subtraction sentence ( $10 - 1 = 9$ ) in the exercises at the bottom of the page. Ask them to find the other subtraction sentence that uses 10, 1, and 9 ( $10 - 9 = 1$ ). Have them draw lines for matching the two related subtraction sentences. Ask them to find the related subtraction sentence for  $10 - 4 = 6$  and match the two sentences. Continue matching pairs of sentences, leaving  $10 - 5 = 5$  until the last because it has no related sentence. Have the children discuss why there is no related subtraction sentence for  $10 - 5 = 5$ .

- Make a chart showing the subtraction facts having minuends of 10 and display it where the children can see it. Encourage them to study it in their spare time in preparation for frequent oral practice sessions for developing rapid recall of the basic facts.

Complete the number sentences.



$$10 - 1 = 9$$



$$10 - 2 = 8$$



$$10 - 3 = 7$$



$$10 - 4 = 6$$



$$10 - 5 = 5$$



$$10 - 6 = 4$$



$$10 - 7 = 3$$



$$10 - 8 = 2$$



$$10 - 9 = 1$$

$$10 - 1 = 9$$

$$10 - 4 = 6$$

$$10 - 7 = 3$$

$$10 - 5 = 5$$

$$10 - 2 = 8$$

$$10 - 6 = 4$$

$$10 - 9 = 1$$

$$10 - 8 = 2$$

$$10 - 3 = 7$$

48 (forty-eight)

Subtraction facts, minuends of 10

## LESSON ACTIVITY

### Before Using the Page

- Begin by having the children count from 0 to 10 and from 10 to 0.

- Have some children work with a number line on the floor or on the chalkboard and others use their individual number lines for carrying out instructions similar to the following:

"Start at 10. Move back 4 steps. At what number do you stop? Write the subtraction sentence."

Repeat for all the subtraction facts having minuends of 10.

- Have the children cut pictures from magazines or catalogues and use them to illustrate the subtraction facts having minuends of 10.

- Prepare a work sheet showing several ten-strips. Give one sheet to each child. Place ten cutouts on the display board. Ask one child to remove some of them. Have the other children show how many were removed by crossing out some squares from the end of a ten-strip. Ask them to write the subtraction sentence below the strip.



$$10 - 7 = 3$$

Return the cutouts to the display board to make a set of ten again. Have another child remove some of them. Ask the other children to illustrate the operation on a ten-strip and write the subtraction sentence. Repeat several times. Include the two cases where zero cutouts are removed and ten cutouts are removed.

### Using the Page

- Read the instruction at the top of the page to the children. Ask how many feathers there are and how many of them are marked with an X. Ask how many feathers are not crossed out. Have the children trace over the dotted 9. Ask a child to read the subtraction sentence. Discuss the second exercise in a similar way, and then let the children work independently.

For the subtraction sentences at the bottom of the page, encourage the children to write the answers without referring to the illustrations.

## LESSON OUTCOME

Complete basic subtraction facts, minuends to 10

## Materials

pocket chart as described on page T38, dominoes with dot patterns or numerals to 10, dice for 10, 9, 8, 7, 6, 5, and 0, 1, 2, 3, 4, 5

## Vocabulary

hexagon (optional)

## RELATED ACTIVITIES

- Prepare work sheets showing subtraction exercises. Give these to the children every few days and time them for one minute. Have each child try to improve her/his previous score.
- Because of the shape of the honey cells shown on the page, the word *hexagon* may be introduced at this time. Compare the shape of the cells with the hexagonal pieces that are sometimes included in the sets of attribute blocks.
- You may wish to introduce the topic of tiling, that is, the fitting together of congruent shapes without overlapping or leaving any gaps. Have children form a tiling pattern using identical hexagonal pieces (or other shapes) from a set of pattern blocks. Let them discover that circles will not tile. Several pieces of two or three different shapes may also tile. Some tiling patterns are shown on page T83.



Subtraction practice minuends to 10

(forty-nine) 49

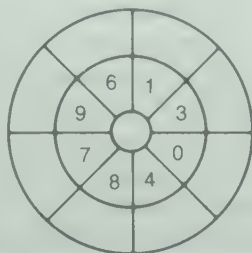
## LESSON ACTIVITY

## Before Using the Page

- Because this page provides a review of subtraction facts having minuends to 10, you may wish to begin by using a number wheel for subtraction.

Draw a number wheel on the chalkboard as shown. Write the subtraction sentence  $9 - 3 = \underline{\quad}$  beside it. Say, "Nine minus three equals a certain number. What is the number?" Have a child record the number. Point to the number wheel and make the same statement as you print 9 in the centre of the wheel, 3 beside it in the second band, and point to the empty space in the outer band. Have a child write the answer in the outer band. Repeat the procedure for other sentences, pointing out that the number 9 in the centre is used each time.

- Use the pocket chart described on page T38 to review subtraction facts having minuends to 10.



- Play the game "What Is the Difference?" with dominoes showing dot patterns to 10 or the numerals to 10. Adapt the rules for the second activity in *Related Activities* on page T46 to subtraction so that the difference for adjoining halves is a number agreed upon before the start of the game.
- Adapt the game "Throw a Row" described on page T57, for subtraction. Use two dice, one marked 10, 9, 8, 7, 6, 5, and the other marked 0, 1, 2, 3, 4, 5. Use the game board shown.

|   |    |   |   |    |
|---|----|---|---|----|
| 9 | 1  | 5 | 6 | 9  |
| 2 | 10 | 7 | 5 | 1  |
| 6 | 3  | 2 | 0 | 5  |
| 0 | 8  | 4 | 8 | 4  |
| 3 | 7  | 6 | 4 | 10 |

## Using the Page

- If a number wheel was discussed as suggested in *Before Using the Page*, the children should be able to work independently, even though the wheels have been adapted to the shape of honey cells. Ask children to describe how the answers 1 and 3 are obtained. Have the children trace over the dotted numerals and then continue on their own.



## LESSON OUTCOME

Determine the missing first addend in an addition sentence, sums to 10

### Materials

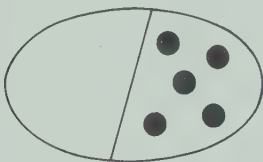
box or paper bag, marbles

### Background

On page 40 the children were introduced to the concept of a missing addend, which was always the second addend in an addition sentence. On page 50 the children will work with addition sentences in which the first addend is missing, for example,  $\underline{\quad} + 3 = 8$ .

## RELATED ACTIVITIES

- Adapt the activity with coat hangers that is described on page T50.
- Prepare a work sheet showing partitioned set holders with one part empty. Associate an addition sentence with each set. Have the children complete each set and the addition sentence.



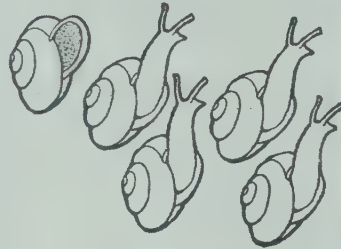
$$\underline{\quad} + 5 = 9$$

- Have the children play the game "Pick a Number" described on page T83.

Complete the number sentences.



$$\underline{1} + 2 = 3$$



$$\underline{1} + 4 = 5$$

$$\underline{2} + 5 = 7$$

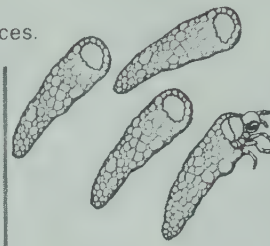
$$\underline{2} + 3 = 5$$

$$\underline{3} + 7 = 10$$

$$\underline{5} + 4 = 9$$

$$\underline{6} + 1 = 7$$

$$\underline{7} + 3 = 10$$



$$\underline{3} + 1 = 4$$



$$\underline{6} + 2 = 8$$

$$\underline{4} + 4 = 8$$

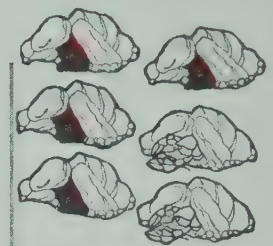
$$\underline{3} + 3 = 6$$

$$\underline{3} + 5 = 8$$

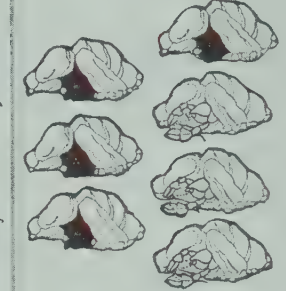
$$\underline{8} + 2 = 10$$

$$\underline{3} + 6 = 9$$

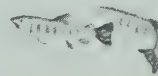
$$\underline{6} + 4 = 10$$



$$\underline{4} + 2 = 6$$



$$\underline{4} + 3 = 7$$



50 (fifty)

Writing missing addends, sums to 10

## LESSON ACTIVITY

### Before Using the Page

- Hide nine marbles in a box or a paper bag. Write the sentence  $\underline{\quad} + 3 = 9$  on the chalkboard. Read the sentence in this way: "What number plus three equals nine?" Tell the children this story: "I had some marbles in this bag. Then my friend gave me three more marbles. Now I have nine marbles. Can you find out how many marbles I had before my friend gave me any marbles?"

If the children ask to see the marbles in the bag, let them, because it may spark the idea of separating the three that were given to you from the whole set to discover that you must have had six marbles originally.

Illustrate the story by drawing nine dots enclosed in a ring to represent the nine marbles in the bag. Partition the set to indicate the number given by the friend. Have a child write the numeral for the missing addend in the sentence.

Repeat the activity for different numbers. Have the children help to draw the diagrams. They may wish to create the stories.

- Draw a partitioned set holder on the chalkboard. Draw four objects on the right side of the partition. Then write the sentence  $\underline{\quad} + 4 = 7$ . Ask the children how many more are needed to make a set of seven. Have a child draw objects on the other side of the partition to complete the set. Have another child complete the addition sentence. Repeat the activity using other examples.

### Using the Page

- Read the instruction and discuss the first exercise with the children. Ask how many snails there are, how many shells there are, and how many more snails are needed for there to be one in each shell. Have the children trace over the dotted 1. Have the children reason as follows: "There are two snails. If there are to be three snails, one more snail is needed." Discuss the second example in a similar way, and then let the children work independently.

When completing the two columns of number sentences at the bottom of the page, ask the children to make statements silently similar to those suggested above. Some children may need to use counters with a sheet of paper marked into two parts.

## LESSON OUTCOME

Write a number sentence for a story problem and answer the question of the problem

### Materials

different kinds of counters (beads, buttons) for sets of 10

## RELATED ACTIVITIES

- Children frequently have difficulty in deciding whether the operation of addition or subtraction is to be used to solve a problem. It is important to provide these children with many opportunities to use objects as in the first activity for *Before Using the Page*. As the children have experiences with objects being joined to those they already have or being separated from them, they learn to associate joining with addition, and separation or removal with subtraction. Allow these children to use counters to illustrate the problem being considered, and then have them write a number sentence.
- For an on-going exposure to word problems, you may wish to write a problem on the chalkboard every day for the children to illustrate and solve. Encourage the children to make up their own word problems. Some children may be able to write their problems on the chalkboard for other children to solve.
- Prepare a tape cassette of problems similar to those on the page for children to listen to and solve.


Write a number sentence for each problem.  
Show the answer.

3  s

5  s

How many in all?

$$3 + 5 = 8$$

8  s


10  s

7 flew away.

How many were left?

$$10 - 7 = 3$$

3  s

6  s

2 more came.

How many in all?

$$6 + 2 = 8$$

8  s

8  s

6 ran away.

How many were left?

$$8 - 6 = 2$$

2  s


9  s

4 went away.

How many were left?

$$9 - 4 = 5$$

5  s

5  s

5 more came.

How many in all?

$$5 + 5 = 10$$

10  s

Solving problems: sums and minuends to 10

(fifty-one) 51

## LESSON ACTIVITY

### Before Using the Page

- Give a different number of counters, not more than ten, to each of several children. Use beads for some children, buttons for others, and so on. Give one of these children a few more counters or take away a few. Then have the child tell the story: "I had six beads. Then the teacher gave me two more. Now I have eight beads." Have the other children help to write the number sentence for the story. Repeat the procedure for as many stories as possible.
- Continue the preceding activity, but ask the children not to finish their stories. Instead, have the other children write a number sentence for each story and tell how it will end. For example, one child may say, "First I had eight beads. Then the teacher took away seven. How many beads do I have now?" The other children will write " $8 - 7 = 1$ " and state, "You have one bead left."
- Tell a story without using concrete objects. For example, "I had three acorns. Then I found five more acorns. How many acorns do I have now?" Have the children write a number

sentence to solve the problem ( $3 + 5 = 8$ ) and answer the question of the problem. ("You have eight acorns now.")

Encourage children to use their imagination to create their own stories for the other children to write number sentences for and solve the problems.

### Using the Page

- Read the instructions with the children. Discuss the first problem. Have children interpret the story by telling it in their own words. Read each problem with the children to ensure that they understand each situation. Then let the children work independently. Give help to those who have difficulty. Allow children to use counters if they need them.



## LESSON OUTCOME

Recognize one-half of a whole; use the symbol  $\frac{1}{2}$

### Materials

objects to be cut into halves (apples, oranges, ribbon, paper strips), Plasticine, sheets of paper in many shapes, scissors

### Vocabulary

one-half, halves

## RELATED ACTIVITIES

- After the children have completed the page, discuss with them the shapes that are not ringed and how they could be marked to show two equal parts.
- Give the children sheets of paper. Have them fold the sheets in half and cut some designs on and around the fold lines. The children may color these for display. Emphasize the fold line of each shape by drawing a thick line over it.

1 red part  
2 equal parts

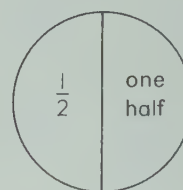


$\frac{1}{2}$  is red.

1 red part  
2 equal parts

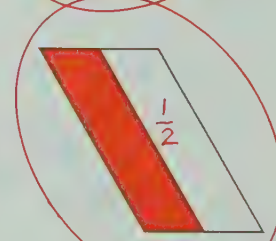
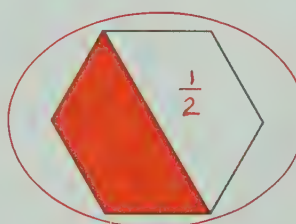
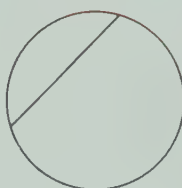
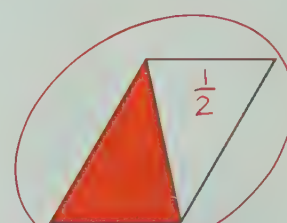
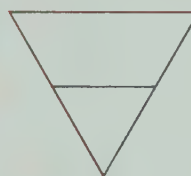
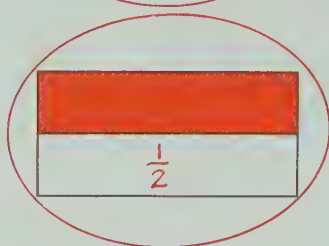
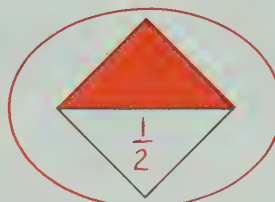
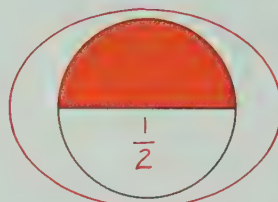


$\frac{1}{2}$  is red.



Ring each picture that shows halves.

Color one half. Print  $\frac{1}{2}$  on the other half.



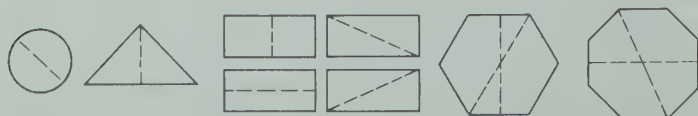
52 (fifty-two)

Introduction to the symbol  $\frac{1}{2}$

## LESSON ACTIVITY

### Before Using the Page

- Begin with activities involving concrete materials so that the children can experience the concept of one-half of an object. Introduce the idea of sharing one object (apple, orange, cookie, sandwich) equally between two children by doing the actual cutting. Then distribute various lengths of ribbon, string, or paper strips and have children find half of each length (by folding and cutting). Children may also make simple shapes out of Plasticine and cut them in half.
- Give the children a variety of shapes to be folded in half. When the shapes have been folded, have several children show theirs to the other children. This may result in a discussion of the different ways to fold a square shape and a rectangular shape in half.



Have the children cut the shapes along the fold lines. Ask them questions similar to the following:

“When you cut something in half, how many parts are there?”

“Are the parts of the same size or different sizes?”

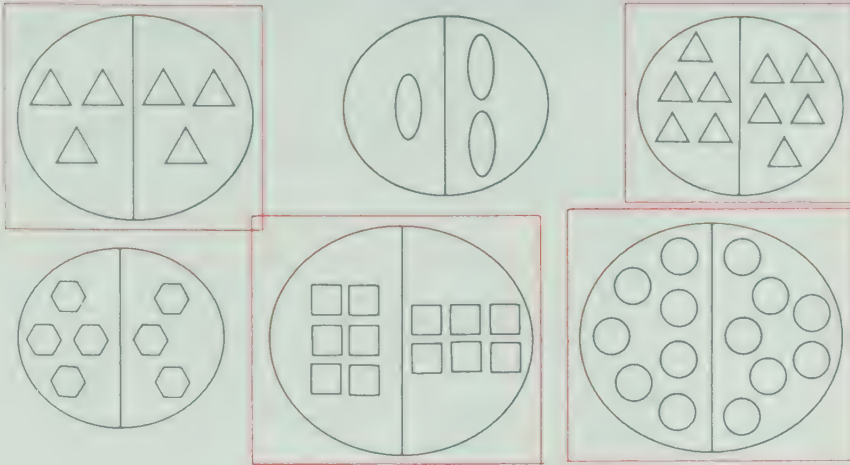
- Use shapes that come in halves. Place one half of each shape on the display board and the other half on a table. Have children match the two halves of each shape by placing one on top of the other. Then have them place the halves to show the complete shape. Ask questions as in the previous activity.
- Show the children how to write the symbol  $\frac{1}{2}$ . (Note that the bar of the fraction is horizontal.) Explain that the symbol means one part of an object that has been cut into two equal parts.

### Using the Page

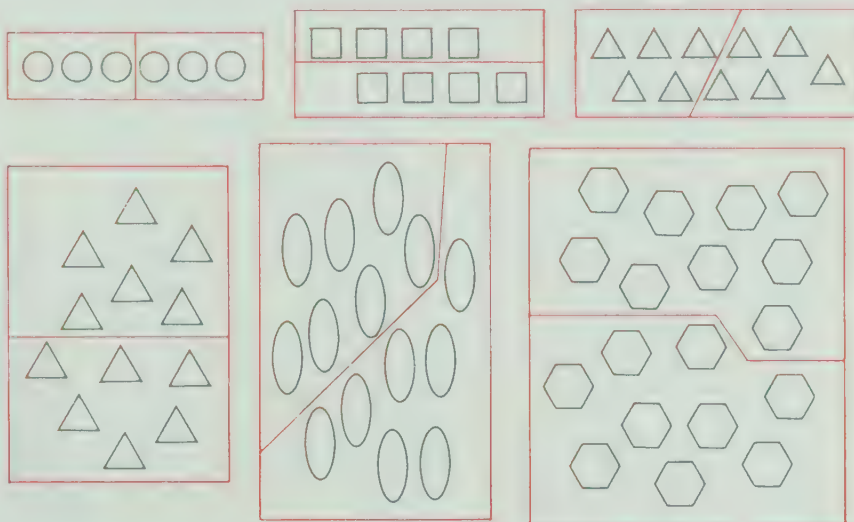
- Discuss the diagrams at the top of the page. Then ask the children to find a shape that is not marked into halves. Make certain that they say, “The two parts are not equal,” and not “The two halves are not equal.”

Read and discuss the instructions with the children to ensure that the three steps will be followed.

Color the sets that are marked into halves.



Mark each set into halves.



Identifying one-half of a set

(fifty-three) 53

## LESSON OUTCOME

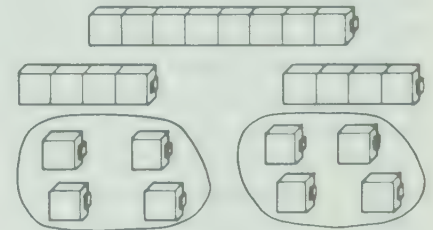
Distinguish between sets that show one-half and those that do not; identify one-half of a set

## Materials

three drawings of a pear cut into two parts, beads, display board and cutouts, sets of small objects

## RELATED ACTIVITIES

- Have the children fasten together a given number of Unifix cubes (Pop-it beads, Lego bricks) to form a row and then split the row into two halves. The children will likely do this visually. Then have them break each half into individual pieces and place them inside two set holders to show the two halves.



- Even and odd numbers could be discussed at this time in terms of those sets that can be separated into two equal parts (halves) and those that cannot. Let the children decide how many there will be in the set at first and then partition them. Discuss the results.

## LESSON ACTIVITY

### Before Using the Page

- Begin by showing three drawings of a pear cut into two parts. One of the drawings should show two equal parts. Ask the children which they would choose if they wanted to share a pear equally with a friend. Ask why. Ask which pear has been cut in half. Review the meaning of the symbol  $\frac{1}{2}$  (one of two equal parts).
- Give one child six beads and say, "Here are six beads. Half of them are for you and half of them are for Tim." The other children watch to see how the halves are determined. Record the results in a chart on the chalkboard. Repeat once or twice and then have the children continue the activity, working in pairs and using counters as indicated in the first column of the chart. Have them record their results in a chart on paper. Discuss the results.

| Whole set | Half of the set | Half of the set |
|-----------|-----------------|-----------------|
| ●●●●●● 6  | ●●● 3           | ●●● 3           |
| 10        |                 |                 |

- Place sets of cutouts on the display board, some partitioned into halves and others into unequal parts. Have the children indicate those that show halves and check by counting. You may wish to record the results.
- Place a set of objects arranged symmetrically on the display board. Have a child partition the set into halves. Repeat several times.

### Using the Page

- Read the first instruction to the children. Ask them whether they should color the first set and why. Then let the children work independently.

Read the second instruction to the children. Have them ring the first set and then make a mark to show two equal groups. Ask how many circles there are in each group. Ask how many circles there are in the whole set. Ask whether the set is marked correctly. Then let the children draw a ring around the second set and continue on their own. Remind them to check their answers by counting how many shapes there are in each half of the set.



## LESSON OUTCOME

Add and subtract amounts of money, to 10 cents

## Materials

real money, play money, or coin cutouts from copies of page T327, play store or store chart

## Vocabulary

dime, change

## RELATED ACTIVITIES

- Let the children use the play store as much as possible for buying items. Encourage them to use nickels and dimes and to make change for these coins. Help them to count out the change for a nickel or a dime by using the method of counting on. Discuss the different coins that can be used to give, say, 7 cents in change (seven pennies or one nickel and two pennies).
- You may wish to have the children do some preliminary work for grouping by tens. Place pennies in multiples of ten (to 90) in several jars. Have children determine the number of dimes they could obtain in exchange for the pennies that are in each jar.



dime

10 cents 10¢

Complete.

| I have | I spend | How much left? |
|--------|---------|----------------|
|        | 3¢      | <u>7</u> ¢     |
|        | 4¢      | <u>6</u> ¢     |
|        | 8¢      | <u>2</u> ¢     |

| I have | I get | I have in all | I spend | How much left? |
|--------|-------|---------------|---------|----------------|
| 5¢     | 1¢    | <u>6</u> ¢    | 3¢      | <u>3</u> ¢     |
| 4¢     | 3¢    | <u>7</u> ¢    | 2¢      | <u>5</u> ¢     |
| 7¢     | 2¢    | <u>9</u> ¢    | 4¢      | <u>5</u> ¢     |
| 6¢     | 4¢    | <u>10</u> ¢   | 5¢      | <u>5</u> ¢     |
| 5¢     | 3¢    | <u>8</u> ¢    | 4¢      | <u>4</u> ¢     |
| 7¢     | 3¢    | <u>10</u> ¢   | 8¢      | <u>2</u> ¢     |
| 4¢     | 2¢    | <u>6</u> ¢    | 6¢      | <u>0</u> ¢     |
| 1¢     | 9¢    | <u>10</u> ¢   | 2¢      | <u>8</u> ¢     |

54 (fifty-four)

Adding and subtracting with money, amounts to 10 cents

## LESSON ACTIVITY

## Before Using the Page

- Review the terms *penny*, *nickel*, *dime*, and the value of each coin. Then ask questions involving adding and subtracting amounts of money. For example,

“I have two nickels. How much money do I have?”

“I have one nickel and three pennies. How much money do I have?”

“I had 4 pennies and I got 5 more pennies. How much money do I have now?”

“I have a dime and I buy something that costs four cents. How much money do I have left?”

- Use the play store, a store chart, or write a list of items on the chalkboard with prices indicated. Ask the children to find any two items that together cost 10 cents. Discuss their choices. You may wish to record their answers on a chart.
- Have each child use a dime to buy just one item and to record the transaction in a number sentence or on a chart.
- Discuss the following problem with the children.

“I have a dime and I owe my friend 3 cents. How can I pay my friend if she has no coins to give me as change?”

Most children will likely tell you that you could go to a store, exchange the dime for 10 pennies, and then pay your friend and have 7 pennies left.

Examples of this kind of problem will lay the foundation for regrouping one ten as ten ones for later work in subtraction.

## Using the Page

- Have the children look at the pennies shown at the top of the page. Ask what coin has the same value as ten pennies. Read the words in the first chart with the children and discuss the first exercise. You may have them use their fingers to cover three pennies and then count the remaining pennies. The children may write  $10 - 3$  as an intermediate step before writing the 7 in the third column, but encourage mental computation. Read the words for the second chart and discuss how the answers given were obtained. Have the children trace over the dotted numerals and then continue on their own. You may prefer to have the children complete the column “I have in all” for all the exercises first, and then complete the column “How many left?”

## OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

## Vocabulary

left, right

## RELATED ACTIVITIES

- Prepare practice sheets for addition facts in vertical form and other sheets for subtraction facts in vertical form. Use these every few days. Time the children for one minute and encourage each child to improve her/his previous score.

Add or subtract.

$$\begin{array}{r} 6 \\ + 1 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 9 \\ - 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 2 \\ - 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 6 \\ + 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 2 \\ + 4 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 6 \\ - 6 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 3 \\ - 0 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 5 \\ + 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 6 \\ - 4 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 \\ - 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 \\ - 5 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 3 \\ + 7 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 8 \\ - 8 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 1 \\ + 9 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 9 \\ - 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 \\ + 0 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ - 4 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 \\ - 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 4 \\ + 1 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 6 \\ + 2 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 8 \\ - 7 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 7 \\ - 5 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 0 \\ + 5 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 10 \\ - 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 7 \\ - 3 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 2 \\ + 8 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 10 \\ - 4 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$$

Addition and subtraction practice sums and minuends to 10

(fifty-five) 55

## LESSON ACTIVITY

## Before Using the Page

- Write the following number sentences on the chalkboard.

$7 + 3 = \underline{\quad}$

$9 - 4 = \underline{\quad}$

$10 - 8 = \underline{\quad}$

$10 - 5 = \underline{\quad}$

Have the children copy and complete the number sentences. After this has been done, have the children write on the chalkboard the corresponding vertical form beside each number sentence. If operational signs are forgotten, ask the children if they can tell whether they should add or subtract in such cases. They will see the need for the signs and then include them. Then have the children write the answers.

Although 10 is a two-place numeral, children at this stage usually respond to it without any thought of place value. Interpreting 1 ten as 10 ones is virtually automatic as children subtract from 10.

- Have children go to the chalkboard, one at a time. State an addition or a subtraction fact for each child to write in vertical form. Have other children write the answers on the chalkboard.

This activity may encourage the children to pay more attention to the sign of operation, something about which they can become very careless.

## Using the Page

- Have the children write their answers on the eggs. After the children have completed the page, you may wish to have them color some of the eggs according to a code; for example, "On some eggs you wrote 7. Color the eggs blue." "On some eggs you wrote 5. Color the eggs green." "How many eggs did you color?"

You may wish to continue with other questions for reviewing ordinal number concepts and counting; for example, "Which column has the most colored eggs?" (second) "Which row has two pairs of answers that are the same?" (fifth) "How many eggs are colored in the second row?" (zero) "How many eggs show addition exercises?" (17) "How many eggs show subtraction exercises?" (19)

You may also wish to have the children use the words *left* and *right* by discussing exercises in the columns to the left and to the right of the picture of the seagull.



## LESSON OUTCOME

Identify sets of tens from 1 ten to 9 tens; write the numerals for tens from 10 to 90

### Materials

objects for grouping by tens (straws, sticks, pegs, record centres); fasteners (string, rubber bands, twist ties, pipe cleaners); cards showing the words *ten* to *ninety* and the numerals 10 to 90


### Vocabulary


tens, ten, twenty, thirty, . . . , ninety


## RELATED ACTIVITIES


- Play the game “How Many Tens?” using nine flash cards. The numerals 10 to 90 are written on one side. The phrases 1 ten, 2 tens, 3 tens, and so on, are written on the reverse side of the corresponding cards. Choose a leader. The leader shows one side of one card, for example, 5 tens. The children say, “Fifty”. If the card shows 50, the children say, “Five tens”. This may be a written or an oral activity. A correct response from a child permits her/him to become the leader.


How many?

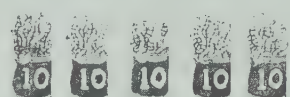
























|               |                   |
|---------------|-------------------|
| <u>1</u> ten  | <u>10</u> ten     |
| <u>2</u> tens | <u>20</u> twenty  |
| <u>3</u> tens | <u>30</u> thirty  |
| <u>4</u> tens | <u>40</u> forty   |
| <u>5</u> tens | <u>50</u> fifty   |
| <u>6</u> tens | <u>60</u> sixty   |
| <u>7</u> tens | <u>70</u> seventy |
| <u>8</u> tens | <u>80</u> eighty  |
| <u>9</u> tens | <u>90</u> ninety  |

56 (fifty-six)

Identifying the number of sets of tens

## LESSON ACTIVITY

### Before Using the Page

- Many objects (straws, sticks, pegs, record centres) can be used for grouping by tens. You may choose to use more than one kind. Distribute ten of each object to each child. Have the children use string, rubber bands, or twist ties, if necessary, to bundle the ten objects together. Ask several children how many objects they have in their bundle. The children will realize that each child has a bundle or a group of ten objects, even though the objects may differ from child to child.

Ask one child to stand in front of the group with her/his bundle of ten. Say, “There is *one ten*.” Have other children, in turn, bring their bundles of ten and join the first child. Each time, have the children say how many tens there are; for example, “Now there are *six tens*.” Stop at nine tens.

- Display nine bundles of tens in a row. Have children count by tens slowly as you indicate the bundles in turn. Then repeat the counting, but before the children say the number, indicate and say how many tens are being counted. For example, the sequence would be one ten—ten, two tens—twenty, . . .

- Have prepared nine large cards on which the words *ten* to *ninety* are printed and nine smaller cards for the numerals 10 to 90. Display these in separate groups in any order on the chalkboard ledge or on a table. Call out a number and have one child locate the numeral card and another child locate the word card. Have them place the two cards together so that the correct sequence for 10 to 90 will result.

You may prefer to write the words and the numerals on the chalkboard and have children draw lines to match a numeral with the corresponding word.

- Rote count with the children by tens from 10 to 90 and from 90 to 10.

- Call out the numbers from 10 to 90 in any order and have the children print the corresponding numerals.

### Using the Page

- Have a child read the question and describe what is required for this page. Discuss the first two exercises with the children. Then let them work independently. As they complete each exercise, have them say silently, for example, “Two tens is another name for twenty.”

## LESSON OUTCOME

Count by tens to 90 using dimes

### Materials

real money, play money, or coin cutouts from copies of page T327, objects or pictures of objects with tags showing prices for multiples of ten to 90¢, objects or pictures of objects without price tags

### RELATED ACTIVITIES

- Prepare trays to hold different numbers of pennies (multiples of ten to 90). Use a letter to identify each tray. Have children stack pennies to make as many tens as possible and record the number. They may exchange a stack of ten pennies for one dime. Have them record their findings.

You may wish to place pennies in one tray so that there will be some left over after all the tens have been made. The children may be able to state the value of the pennies. For example, for 3 tens and 4 pennies the value is 34 cents.

- After the children have completed the page, you may wish to ask how many dimes are not used for each purchase and what their value is.

Ring the dimes needed.

|     |  |                               |
|-----|--|-------------------------------|
| 30¢ |  | How many?<br>3<br>_____ dimes |
| 20¢ |  | 2<br>_____ dimes              |
| 40¢ |  | 4<br>_____ dimes              |
| 10¢ |  | 1<br>_____ dimes              |
| 50¢ |  | 5<br>_____ dimes              |
| 70¢ |  | 7<br>_____ dimes              |
| 60¢ |  | 6<br>_____ dimes              |
| 90¢ |  | 9<br>_____ dimes              |
| 80¢ |  | 8<br>_____ dimes              |

Using dimes to count by tens

(fifty-seven) 57

## LESSON ACTIVITY

### Before Using the Page

- Review counting by tens from 10 to 90.
- Hold up a penny and ask the children to identify it. Ask them how much money they have if they have a penny. Display several pennies (fewer than 10) and have children tell you how many pennies there are and the amount of money.

Display 10 pennies and have the children tell how many there are and the amount of money. Ask what coins they would use to pay for something that costs 10 cents. The reply may be "ten pennies" or "two nickels" or "one nickel and five pennies" or "one dime". Review the value of a dime (10 cents).

- Display nine stacks of 10 pennies in each stack. As you move the stacks together into a single group, have the children count by tens to 90. Then arrange the nine stacks in a row. Place a dime in front of each stack as the children count by tens.

- Display one dime. Have the children tell you how many dimes there are and how much money there is. Increase the number of dimes by one more each time (to 9 dimes) and repeat the questions. Then display sets of dimes in any order.

- Display objects or pictures of objects marked with prices from 10¢ to 90¢. Have children tell how many dimes would be needed to pay for each object. Have children choose the dimes needed to pay for each object.

- Show pictures of objects without prices. Hold up one picture and say, for example, "I used 4 dimes to pay for this. How much did it cost?" Hold up two pictures and say, "I used 3 dimes to pay for this one and 20 pennies to pay for this one. Which one cost more?"

- Give each child a different number of dimes (to 9 dimes). Have each child count the amount of money by saying, "10 cents, 20 cents, 30 cents, . . ."

### Using the Page

- Read the instruction and discuss the first exercise with the children by saying, "How much does the first fishing lure (hook) cost? How many dimes do you need to pay for it? Ring three dimes." Have the children record the number of dimes, and then let them work independently.



## LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding two-place numeral, numbers from 10 to 30

### Vocabulary

names for the numbers to 30, ones' place, tens' place

### Materials

objects for grouping by tens, number board labelled for displaying tens and ones

## RELATED ACTIVITIES

- Children may work in pairs for this activity. One child counts out a number of ones (not more than 30), but does not reveal how many to her/his partner. The partner groups the ones into tens and ones, records how many there are, and states the number.
- Prepare work sheets as shown. Have the children group the dots into tens and show the number represented.

|  |                   |
|--|-------------------|
|  | 1 tens 7 ones     |
|  | 17                |
|  | ___ tens ___ ones |

Complete.



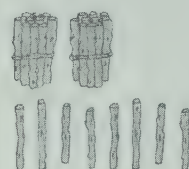
| tens | ones |
|------|------|
| 1    | 2    |

12



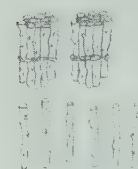
| tens | ones |
|------|------|
| 2    | 3    |

23



| tens | ones |
|------|------|
| 2    | 8    |

28



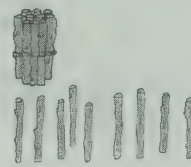
| tens | ones |
|------|------|
| 2    | 6    |

26



| tens | ones |
|------|------|
| 1    | 7    |

17



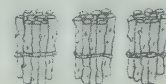
| tens | ones |
|------|------|
| 1    | 9    |

19



| tens | ones |
|------|------|
| 1    | 5    |

15



| tens | ones |
|------|------|
| 3    | 0    |

30



| tens | ones |
|------|------|
| 2    | 4    |

24



| tens | ones |
|------|------|
| 2    | 1    |

21

58 (fifty-eight)

Representing numbers to 30 using tens and ones

## LESSON ACTIVITY

### Before Using the Page

- Rule three columns on chart paper or the chalkboard. Write the numbers from 11 to 20 in the first column. Label the other columns as shown. Give the children objects for grouping by tens. Ask a child to choose a number from the chart. If, for example, 14 is chosen, have the children count out 14 of the items (ones) and then group them to make one group of ten and four ones. (If Base Ten Blocks are used, have the children exchange 10 ones for 1 ten.) Ask how many groups of ten they were able to make.

|    | tens | ones |
|----|------|------|
| 11 |      |      |
| 12 |      |      |
| 13 |      |      |
| 14 | 1    | 4    |
| 15 |      |      |

Have one child display her/his one ten and four ones for other children to see. You may wish to place them on a number board labelled for tens and ones.

On the chart for the row for 14, show how to record that there was 1 ten and 4 more ones.

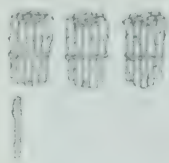
Have children choose a number from the chart and repeat the procedure. Record the results and discuss them. What first appeared to be coincidental soon appears to happen each time. That is, the digits used in forming the numeral are related to the number of tens and ones made with the objects.

- Have the children start at 20 and count to 30. Write the numerals 21 to 30 in a vertical column on the chalkboard, and have the children identify them. Ask if they can tell how many tens and how many ones there would be for 23, without grouping. Then have them check the answer. Display 2 tens and 5 ones. Ask what number is represented. Repeat at least once for each number to 30.

### Using the Page

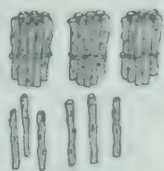
- Discuss the first exercise with the children. Ask them why there is a 1 in the tens' place and a 2 in the ones' place. Ask what number is represented. Have them trace over the dotted numerals. Discuss the second exercise and then let the children work independently.

Complete.



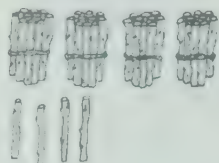
| tens | ones |
|------|------|
| 3    | 1    |

31



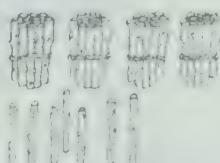
| tens | ones |
|------|------|
| 3    | 6    |

36



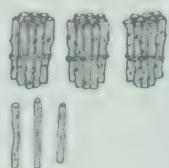
| tens | ones |
|------|------|
| 4    | 4    |

44



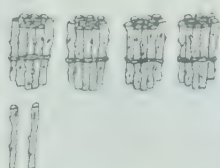
| tens | ones |
|------|------|
| 4    | 7    |

47



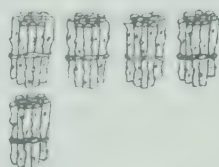
| tens | ones |
|------|------|
| 3    | 3    |

33



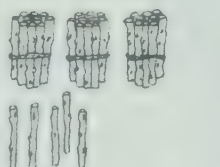
| tens | ones |
|------|------|
| 4    | 2    |

42



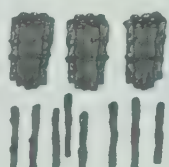
| tens | ones |
|------|------|
| 5    | 0    |

50



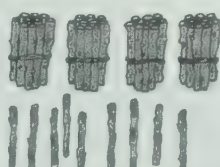
| tens | ones |
|------|------|
| 3    | 5    |

35



| tens | ones |
|------|------|
| 3    | 8    |

38



| tens | ones |
|------|------|
| 4    | 9    |

49

Representing numbers to 50 using tens and ones

(fifty-nine) 59

## LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding two-place numeral, numbers from 30 to 50

### Materials

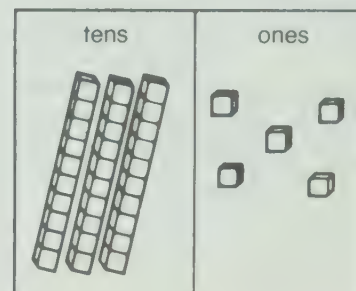
objects for grouping by tens

## RELATED ACTIVITIES

- Prepare pairs of jigsaw cards similar to the one shown. They can be kept in an envelope for the children to work at in their spare time.



- Help each child prepare an abacus chart from a sheet of Bristol board ruled into two columns as shown. The chart should be large enough to hold the objects used for grouping. Have the children use their objects to show the numbers from 31 to 50 on the abacus charts. Each time a number is represented, have the children state the number of tens and the number of ones.



## LESSON ACTIVITY

### Before Using the Page

- Display the objects you wish to use for grouping by tens. Note that the use of different objects for grouping may help the children to see that it is not the objects that are important but the concept of ten.

Review the numbers to 30 by asking how many tens and ones there are for 26, for example, and for other numbers. Also ask questions such as, "What number is represented by 1 ten and 4 ones?" Use the chalkboard, if necessary.

Tell the children that they are now going to consider numbers to 50, and that you wish to see how well they can count to 50. You may choose to have all the children rote count to 50, or you may prefer to have several children count from 1 to 10, others from 11 to 20, and others continue by decades to 50.

- Write the numerals 31 to 40 in the first column of a chart as shown on page T74. Write the numerals 41 to 50 in a second chart. Have children point to the corresponding numerals when you say, "Thirty-five" or "Forty-six".

Begin at 31 and have the children represent these numbers using the objects for grouping. As each number is represented, record the number of tens and the number of ones. It will not be necessary to discuss all the numbers from 31 to 50. Ask children to explain what they did; for example, "I made three tens and five ones for the number thirty-five."

- Ask the children how many tens and how many ones there are for a number, say, 47. Repeat several times. Then ask what number is represented by 3 tens and 6 ones. If you write "47" or "3 tens 6 ones" on the chalkboard, the children will be able to answer the questions more easily.

### Using the Page

- Discuss the first exercise with the children and have them record the number of tens, the number of ones, and the number represented. Then let them work independently for the remaining exercises. As the children complete each exercise you may wish to have them say, for example, "Four tens and four ones represent the number forty-four."



## LESSON OUTCOME

Identify symmetrical shapes

### Materials

pictures of symmetrical things in nature, cutouts of capital letters, cutouts of paper dolls, sheets of paper

### Vocabulary

line of symmetry

## RELATED ACTIVITIES

- Have the children fold a sheet of paper and cut a design around the fold. Have them open the paper and color the symmetrical design. Display the designs.
- Have children fold a sheet of paper and open it. Ask them to use ink, paint, or a charcoal stick to make a design on one side of the fold, and then quickly fold the other side over and press firmly, rubbing if necessary. When they open the paper, the resulting shape will be symmetrical about the fold. When the paint dries, have them mark the line of symmetry along the fold.
- Fold a piece of paper as above, but keep it folded. Using a pin, prick a pattern through the two layers of paper. Open the paper to reveal a symmetrical shape. Have the children do this and mark the line of symmetry.



## LESSON ACTIVITY

### Before Using the Page

- Cut out and display pictures of objects from nature, for example, butterflies, leaves, and flowers. Ask the children if the pictures could be folded in a certain way to show two parts that match. Fold a picture to demonstrate. Then use a marker or a crayon to draw a thick line along the crease to emphasize where the fold was made. Tell the children that the line is called a *line of symmetry*.
- Use cutouts of capital letters of the English alphabet, or print the capital letters on individual sheets of paper. Have the children choose letters and fold them to demonstrate whether there is a line of symmetry, that is, whether they can be folded to obtain two parts that match. Individual sheets can be folded and held up to the light to check whether the two parts match, or a mirror can be placed along the line of symmetry. Some children may discover that there is more than one way to fold some letters (H, I, O, X). Use a marker to highlight the line of symmetry for letters that were folded.

- Display a large cutout of a paper doll in a simple symmetrical pose. Ask if it could be folded so that the two parts match. Have a child fold it. Display another cutout of a paper doll in a non-symmetrical pose. Ask if it could be folded so that the two parts match. Have a child demonstrate. Discuss the results. Then ask the child if he/she can pose in a position to show how the cutout would have to look in order for the two parts to match. There may be many ways to make that change. Have children invent their own symmetrical poses, keeping in mind that the line of symmetry is a vertical one.

### Using the Page

- Read the two instructions to the children. Discuss what they are to do and then let them work independently.

## LESSON OUTCOME

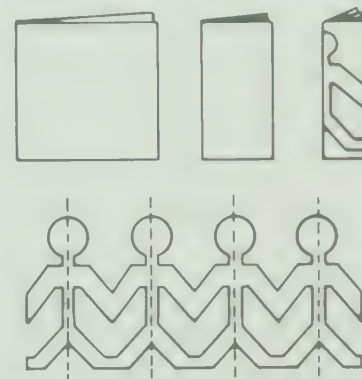
Show a line of symmetry on a shape

### Materials

sheets of paper, circular filter paper, scissors, graph paper

### RELATED ACTIVITIES

- Give each child a sheet of paper large enough to be folded several times. Have them fold it in half and then fold it twice more in the same way, without changing the direction of the folds. Ask them to draw half the outline of a paper doll. Make certain that the outlines for the arm and the leg are drawn to the edge of the paper. Now have the children cut out the outline. When the paper is unfolded, there will be four paper dolls joined as shown. Have the children indicate the lines of symmetry. You may wish to have the children paint or color the shapes for display.



Mark to show two matching parts.



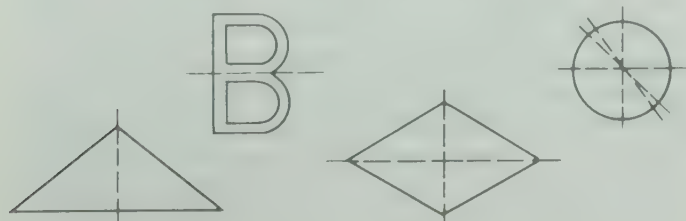
Showing a line of symmetry

(sixty-one) 61

## LESSON ACTIVITY

### Before Using the Page

- Review the fact that when a symmetrical shape is folded in half, the line represented by the fold is called the *line of symmetry*. Point out that the part of the shape on one side of the line of symmetry is identical to the part of the shape on the other side of the line.
- Some objects have only a vertical line of symmetry and others have only a horizontal line of symmetry. Other objects have both vertical and horizontal lines of symmetry, and some objects have more lines of symmetry than can be counted. Circular filter paper is useful for showing a shape that has many lines of symmetry.



Have the children repeat some of the activities suggested on page T76. By folding a sheet of paper vertically and horizontally, shapes having two lines of symmetry can be obtained.

- Have the children indicate a line of symmetry on graph paper. Ask them to draw a shape on one side of the line. Have the children exchange papers and copy the shape on the other side of the line. Encourage them to draw lines of symmetry in different positions—vertically, horizontally, and diagonally.

### Using the Page

- Read the instruction to the children. Discuss how they are to draw a line of symmetry to show two matching parts for each object. Note that there will be many lines of symmetry for the cross section of the tree.



LESSON OUTCOME

Interpret related addition and subtraction situations

Materials

display board and cutouts, yarn or string for set holders

RELATED ACTIVITIES

- Have the children work in groups for thinking up and dramatizing situations that illustrate inverse relationships. One group may act out a situation and the other children may interpret it and state the two related number sentences; for example, "Two children are playing with a ball. Three more children come and join them. Then three children leave."

$2 + 3 = 5$        $5 - 3 = 2$

Such examples help to illustrate the nature of inverse operations.

Complete the number sentences.

|  |  |
|--|--|
| <br>$2 + 1 = \underline{3}$<br><br>$3 - 1 = \underline{2}$ | <br>$3 + 2 = \underline{5}$<br><br>$5 - 2 = \underline{3}$ |
| <br>$4 + 3 = \underline{7}$<br><br>$7 - 3 = \underline{4}$ | <br>$5 + 2 = \underline{7}$<br><br>$7 - 2 = \underline{5}$ |
| <br>$3 + 6 = \underline{9}$<br><br>$9 - 6 = \underline{3}$ | <br>$7 + 1 = \underline{8}$<br><br>$8 - 1 = \underline{7}$ |

62 (sixty-two)

Introduction to related addition and subtraction facts

LESSON ACTIVITY

Before Using the Page

- Place a set of two cutouts and a set of four cutouts on the display board. Use string or yarn for set holders. Ask how many there are in each set. Have a child move the four cutouts and place them with the set of two cutouts. Ask how many cutouts there are now. Write the addition sentence  $2 + 4 = \underline{\quad}$  on the chalkboard and have a child complete it.

Ask a child to remove four of the cutouts. Ask how many are left. Write the subtraction sentence  $6 - 4 = \underline{\quad}$  on the chalkboard and have a child complete it.

Replace the four cutouts. Again ask how many there are. Have a child use yarn or string to partition the set of six into groups of two and four to show the original two sets that were joined. As you point to the two groups and then indicate the whole set, have the children read the addition sentence ( $2 + 4 = 6$ ). As you indicate the whole set and then cover four of the cutouts, have the children read the subtraction sentence ( $6 - 4 = 2$ ).

Repeat the above procedure several times for different numbers. Eventually, reduce the number of steps by beginning with

one set, having the children partition the set into two groups, and asking them to complete the addition and subtraction sentences. Cover the appropriate group when you are having children state the subtraction sentence.

Using the Page

- Help the children to interpret the first picture. Discuss the fact that one raccoon is shown coming to join two raccoons to illustrate the addition sentence  $2 + 1 = 3$ . Then point to the second picture where one raccoon is shown leaving the group to illustrate the subtraction sentence  $3 - 1 = 2$ . It will help to have the children tell a story about the pictures. One child might say, "There were two raccoons and one raccoon came to join them. Then there were three raccoons. I guess he must have changed his mind about staying because he turned around and left. So there were two raccoons just like there were at the beginning."

Discuss the pictures of the birds in a similar way. Then let the children work independently.

Complete the number sentences.



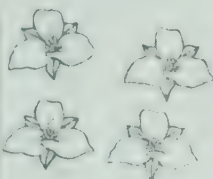
$$3 + 4 = 7$$

$$4 + 3 = 7$$



$$7 - 4 = 3$$

$$7 - 3 = 4$$



$$4 + 1 = 5$$

$$1 + 4 = 5$$



$$5 - 1 = 4$$

$$5 - 4 = 1$$



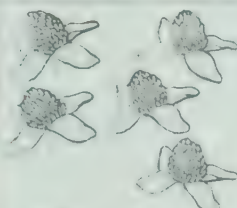
$$6 + 2 = 8$$

$$2 + 6 = 8$$



$$8 - 2 = 6$$

$$8 - 6 = 2$$



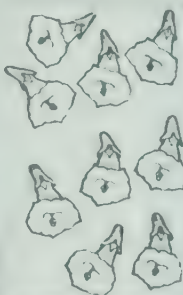
$$5 + 2 = 7$$

$$2 + 5 = 7$$



$$7 - 2 = 5$$

$$7 - 5 = 2$$



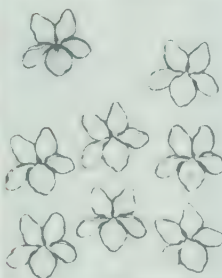
$$4 + 5 = 9$$

$$5 + 4 = 9$$



$$9 - 5 = 4$$

$$9 - 4 = 5$$



$$1 + 7 = 8$$

$$7 + 1 = 8$$



$$8 - 7 = 1$$

$$8 - 1 = 7$$



$$4 + 4 = 8$$

$$8 - 4 = 4$$

Relating addition and subtraction facts: sums to 10

(sixty-three) 63

## LESSON OUTCOME

Complete related basic addition and subtraction facts, sums to 10

### Materials

display board and cutouts

## RELATED ACTIVITIES

- Have the children work in pairs, each pair having ten blocks and one partitioned set holder. One child places blocks to the left and to the right of the partition. Then both children write the related addition and subtraction sentences.

## LESSON ACTIVITY

### Before Using the Page

- Ask a child to place five cutouts on the display board. Ask another child to place four more cutouts with the others. Ask how many were placed by the first child and how many were placed by the second child. Write the sentence  $5 + 4 = \underline{\quad}$  on the chalkboard. Ask how many cutouts there are altogether and have a child complete the addition sentence.

Remove the cutouts and ask the two children to place them on the display board again, but in the reverse order. Emphasize the numbers of cutouts that were placed first. Write the addition sentence  $4 + 5 = \underline{\quad}$  on the chalkboard. Ask why the numbers are placed in this order. Ask if the answer will be different for this sentence. Have a child complete the addition sentence.

Ask a child to remove four of the nine cutouts on the display board. Point out that when four are removed, the number of cutouts remaining is the same as the number the first child started with. Write the subtraction sentence  $9 - 4 = \underline{\quad}$  and have a child complete it.

Start with nine cutouts again. Ask a child to remove five of

them. Ask how many are left. Point out that when five are removed, the number of cutouts remaining is the same as the number the second child started with. Write the subtraction sentence  $9 - 5 = \underline{\quad}$  and have a child complete it.

- Ask a child to choose a number from one to ten. Suppose the child chooses six. Ask another child to choose a number from one to four. (This ensures that the sum will be 10 or less.) Suppose the child chooses four. Ask if the order of adding the two numbers matters. Write the two sentences  $6 + 4 = \underline{\quad}$  and  $4 + 6 = \underline{\quad}$  on the chalkboard and have the children complete them. Then write the two subtraction sentences  $10 - 4 = \underline{\quad}$  and  $10 - 6 = \underline{\quad}$  and have the children complete them. Discuss the fact that the four sentences show a relationship among the same three numbers: 10, 6, and 4.

### Using the Page

- Discuss the first exercise with the children. As each number sentence is discussed, have the children trace over the dotted numeral. Then let the children work independently. After the children have completed the page, ask why there are only two related sentences for each exercise at the bottom of the page.



# LESSON OUTCOME

Complete related basic addition and subtraction facts, sums to 10

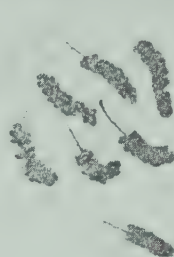
## Materials

display board and cutouts, yarn or string, chart paper, ten counters for each child

## RELATED ACTIVITIES

- Have the children make charts of related number sentences for sums to 10. They may draw a partitioned set for each family of facts.

Complete the number sentences.

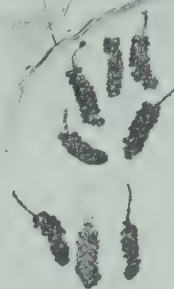


$$6 + \underline{1} = 7$$

$$1 + \underline{6} = 7$$

$$7 - 1 = \underline{6}$$

$$7 - 6 = \underline{1}$$



$$\underline{5} + 3 = 8$$

$$\underline{3} + 5 = 8$$

$$8 - 3 = \underline{5}$$

$$8 - 5 = \underline{3}$$

$$1 + \underline{3} = 4$$

$$3 + \underline{1} = 4$$

$$4 - 3 = \underline{1}$$

$$4 - 1 = \underline{3}$$

$$\underline{4} + 2 = 6$$

$$\underline{2} + 4 = 6$$

$$6 - 2 = \underline{4}$$

$$6 - 4 = \underline{2}$$

$$9 - 2 = \underline{7}$$

$$9 - 7 = \underline{2}$$

$$7 + \underline{2} = 9$$

$$2 + \underline{7} = 9$$

$$\underline{5} + 0 = 5$$

$$\underline{0} + 5 = 5$$

$$5 - 0 = \underline{5}$$

$$5 - 5 = \underline{0}$$

$$6 + \underline{3} = 9$$

$$3 + \underline{6} = 9$$

$$9 - 3 = \underline{6}$$

$$9 - 6 = \underline{3}$$

$$8 + \underline{1} = 9$$

$$1 + \underline{8} = 9$$

$$9 - 1 = \underline{8}$$

$$9 - 8 = \underline{1}$$

$$\underline{8} + 2 = 10$$

$$\underline{2} + \underline{8} = 10$$

$$10 - \underline{2} = \underline{8}$$

$$10 - \underline{8} = \underline{2}$$

$$6 + \underline{0} = 6$$

$$0 + \underline{6} = 6$$

$$6 - \underline{0} = \underline{6}$$

$$6 - \underline{6} = \underline{0}$$

$$10 - 4 = \underline{6}$$

$$10 - 6 = \underline{4}$$

$$\underline{6} + \underline{4} = 10$$

$$\underline{4} + \underline{6} = 10$$

64 (sixty-four)

Relating addition and subtraction facts, sums to 10

## LESSON ACTIVITY

### Before Using the Page

- Write the sentence  $6 + \underline{\quad} = 8$  on the chalkboard. Place eight cutouts in a set holder on the display board. Ask the children what number added to 6 gives 8. Place yarn or string to partition the set to show six cutouts on the left side. This enables the children to see that the missing addend in the sentence must be 2.

Repeat the activity using other numbers. Vary the position of the missing addend in the number sentences. Have children do the partitioning and complete the sentences.

- Write the sentence  $8 - \underline{\quad} = 6$  on the chalkboard. Place eight cutouts in a set holder on the display board. Ask how many would have to be removed for there to be 6 left. Have a child remove the two cutouts to illustrate the situation, then replace them and partition the set as before. Repeat the activity using other numbers.

- Ask each child to separate eight counters into two piles. Ask children how many there are in their first pile and how many there are in their second pile. Write the appropriate addition

sentences in a chart so that a pattern will appear and any missing combinations from  $8 + 0 = 8$  to  $0 + 8 = 8$  can be included.

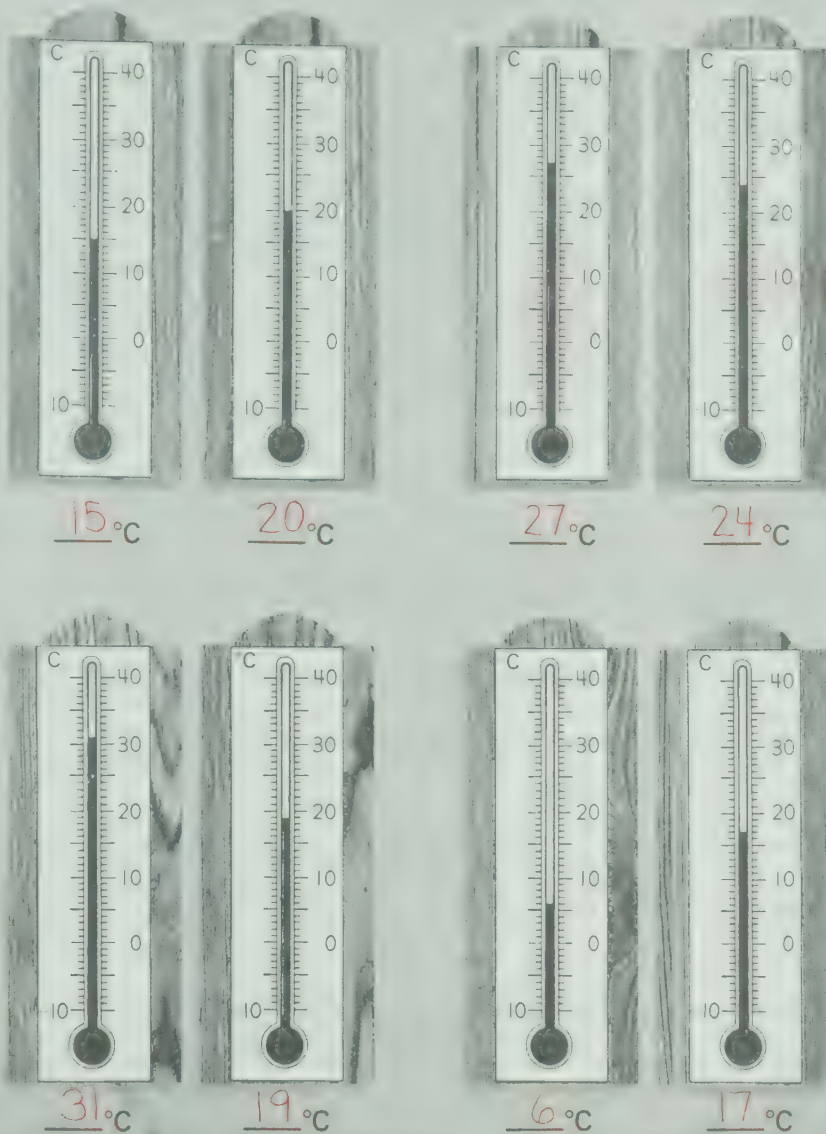
Ask each child to remove some of the eight counters. Ask children how many were removed and how many are left. Write the appropriate subtraction sentences from  $8 - 0 = 8$  to  $8 - 8 = 0$  beside the related addition sentences in the chart.

Point out that for any row in the chart, only three numbers are required for the two sentences; for example, for the two sentences  $1 + 7 = 8$  and  $8 - 7 = 1$ , the numbers are 1, 7, and 8. Ask the children to write (without looking at the chart) an addition sentence and a subtraction sentence using the numbers 3, 5, and 8. When you discuss their answers, they will realize that there are four possible sentences:  $5 + 3 = 8$ ,  $3 + 5 = 8$ ,  $8 - 3 = 5$ ,  $8 - 5 = 3$ .

### Using the Page

- Discuss the first exercise with the children. As each number sentence is discussed, have the children trace over the dotted numeral. Discuss the second exercise and have the children complete each number sentence. Then let the children work independently.

Write the temperature shown.



Reading temperature

(sixty-five) 65

**LESSON OUTCOME**

Read temperatures above zero on a Celsius scale

**Materials**

demonstration thermometer (See page T83.)

**Vocabulary**

thermometer, temperature, warmer, colder, degrees, Celsius

**RELATED ACTIVITIES**

- Ask a different child to read the outdoor temperature each day at a certain time. Have the child move the red line on the demonstration thermometer to show the temperature. Discuss the changes in temperature from day to day.

You may wish to have the children show each temperature on a copy of page T330.

**LESSON ACTIVITY****Before Using the Page**

- Display a large thermometer. (If you do not have a commercial thermometer for demonstration, you may wish to prepare one as described on page T83.) Discuss the thermometer with the children and how it indicates how hot or how cold the air surrounding it is. Ask how the red line moves to show the temperature when the weather gets warmer (demonstrate this) and how it moves when the weather gets colder (demonstrate again).
- Position the red line at zero and have the children identify the number on the scale. Move the red line to 10 and have a child read the number indicated. Repeat for 20 and 30. (All temperatures being considered in this lesson are above zero.)
- Move the red line to 10 and write "10°" on the chalkboard. Ask if anyone can tell what the symbol ° means. Introduce the word *degrees*. Then show "10°C". Tell the children that the C stands for the word *Celsius*, which names the type of scale used on the thermometer. (You may wish to mention that there is also a Fahrenheit scale, because some children may see this at

home.) Tell the children that the symbol 10°C is read "ten degrees Celsius".

Move the red line to 20 and have a child read the temperature as "twenty degrees Celsius". Repeat for 30°C. Then point to various marks on the scale and have children determine the number associated with the mark and state the temperature.

Name numbers and have children point to the corresponding marks on the scale. Then move the red line to different positions and have children read the temperatures indicated. Name a temperature and have a child move the red line to the correct position on the scale. Repeat many times.

**Using the Page**

- Have the children write the temperature shown on each thermometer. Help those who have difficulty reading the scale. After all the temperatures have been recorded, ask the children which is the warmer temperature on the first two thermometers. Ask them how they can tell which is warmer. Have them ring the colder temperature for the other pair of thermometers in the first row. Ask them how they can tell which is colder. Follow a similar procedure for each pair of thermometers in the second row.



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## Materials

trays and objects for grouping by tens, numeral and word cards for multiples of ten to 90

## RELATED ACTIVITIES

- Play the game "What's My Rule?" with the children. Prepare cards as shown. Have the children study the examples, discover the rule, and complete the chart according to the rule.

| What's My Rule? |   |
|-----------------|---|
| 2               | 5 |
| 6               | 9 |
|                 | 8 |
| 0               |   |

- Have the children use copies of page T335 to make and complete an addition table for sums to 10.

|   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|--|
| + | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |
| 0 |   |   |   |   |   |   |   |   |   |   |  |
| 1 |   |   |   |   |   |   |   |   |   |   |  |
| 2 |   |   |   |   |   |   |   |   |   |   |  |
| 3 |   |   |   |   |   |   |   |   |   |   |  |
| 4 |   |   |   |   |   |   |   |   |   |   |  |
| 5 |   |   |   |   |   |   |   |   |   |   |  |
| 6 |   |   |   |   |   |   |   |   |   |   |  |
| 7 |   |   |   |   |   |   |   |   |   |   |  |
| 8 |   |   |   |   |   |   |   |   |   |   |  |
| 9 |   |   |   |   |   |   |   |   |   |   |  |

## LESSON ACTIVITY

### Before Using the Page

- A review of concepts covered in a unit can be carried out in several ways. Because a review should be considered an ongoing process and not just something that occurs at the end of a unit, you may wish to note the following suggestions for ways to vary a review program.
1. Display flash cards of addition and subtraction facts and have the children respond by using their numeral cards.
  2. Prepare tests on work sheets or write them on the chalkboard.
  3. Conduct oral tests.
  4. Have children play games that reinforce concepts covered.
  5. Prepare activities for the children to do in their spare time.
  6. Note the activities that were not used for teaching certain pages in the unit and use these for review purposes.
- Review the subtraction facts having minuends to 10. Give special attention to the minuend 10.
  - For a review of subtraction as the inverse of addition, make cutouts (animals, toys) and show three numbers on each. Have the children use these for writing as many related addition and

Subtract.

$$9 - 3 = \underline{6}$$

$$10 - 2 = \underline{8}$$

$$8 - 5 = \underline{3}$$

$$10 - 5 = \underline{5}$$

$$7 - 3 = \underline{4}$$

$$10 - 6 = \underline{4}$$

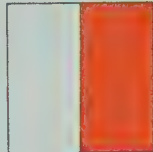
Complete.

$$\underline{3} + 2 = 5$$

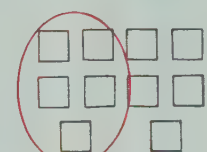
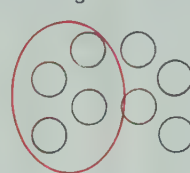
$$\underline{4} + 6 = 10$$

$$\underline{5} + 4 = 9$$

Color one half.



Ring one half.



Complete.

I have 6¢.

I get 4¢.

I have 10 ¢ in all.

I have 8¢.

I spend 2¢.

I have 6 ¢ left.

10¢ 20¢ 30¢ 40¢ 50¢ 60¢ 70¢ 80¢ 90¢



2 tens 3 ones



3 tens 2 ones

$$5 + 2 = \underline{7}$$

$$\underline{2} + \underline{5} = \underline{7}$$

$$7 - \underline{2} = \underline{5}$$

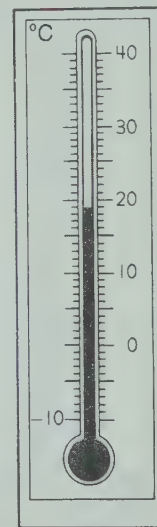
$$7 - \underline{5} = \underline{2}$$

$$\underline{7} + 3 = 10$$

$$\underline{3} + \underline{7} = 10$$

$$10 - \underline{3} = \underline{7}$$

$$10 - \underline{7} = \underline{3}$$



19 °C

66 (sixty-six)

CHECKUP

subtraction sentences as possible. The children may also work at these in their spare time.

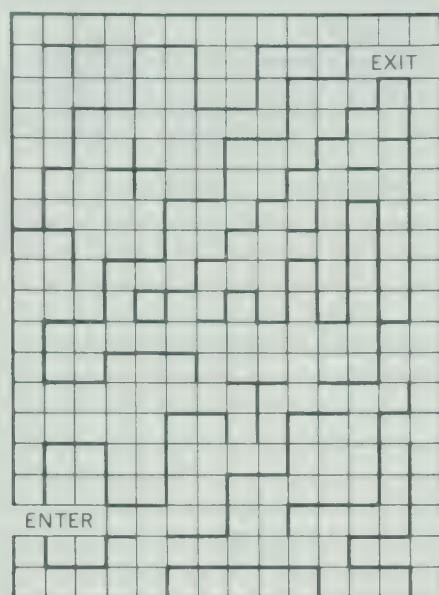
- Other spare-time activities may involve a variety of mazes, coloring one-half of an object and one-half of a set of objects, and solving problems.
- Prepare several trays of different objects for grouping by tens. Have children group them to make as many groups of ten as possible (fewer than 10) and record their results as follows: "Tray A has 4 tens and 3 ones." The groups of ten may then be taken apart in readiness for another child.
- Have the children rote count by tens from 0 to 90 and from 90 to 0. Use the numeral and word cards that are suggested for the preliminary activity on page T72. Display the cards in each set at random and have the children place them in order.

### Using the Page

- Draw attention to the word *Checkup* at the bottom of the page. Review the purpose of this page. Discuss the different types of exercises to ensure that the children know what they are to do. Then let them work independently.

## Games and Activities

### A-Mazing (Game for page 47)



### Tick-Tack-Toe (Game for page 47)

#### Materials

a sheet with several three-by-three grids, or a three-by-three grid on acetate for each pair of players  
marking pens

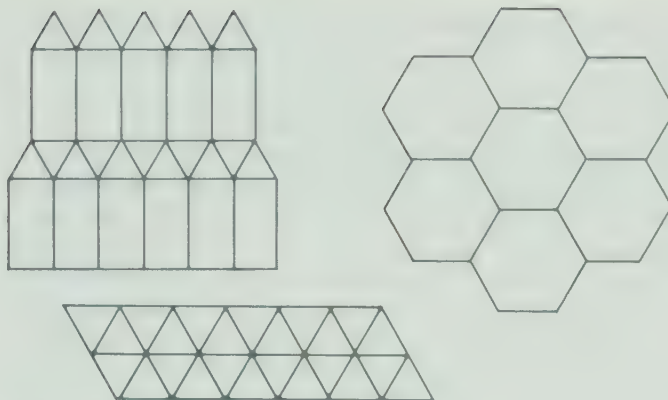
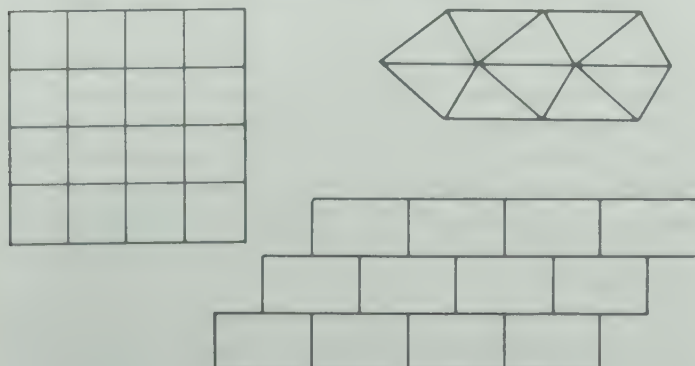
#### Rules

1. One of each pair of players is chosen to make the first mark. In a series of games the players should alternate in making the first mark.
2. The first player makes an X in the square of her/his choice; the partner makes an O in another square.
3. The players attempt to place three of their marks diagonally, horizontally, or vertically to win.

#### Variations:

- The player who obtains three marks in line loses the game.
- One player has three red counters and the partner has three blue counters. Each player in turn places a counter in a square. If neither player wins by placing three counters in line, the players continue the game by moving, in turn, one counter to any adjacent square.

### Tiling Patterns for page 49



### Pick a Number (Game for page 50)

#### Materials

a set of numeral cards for 0 to 10 in a bag  
a set of cards showing incomplete addition sentences, sums to 10  
a sheet showing the completed addition sentences

#### Rules

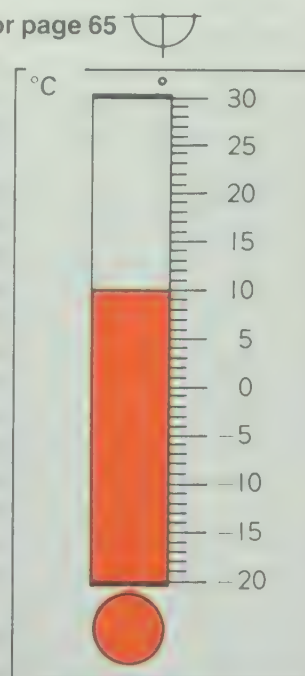
1. The addition sentence cards are placed face down in front of three to five players, one of whom is the "referee".
2. The "referee" turns over an addition sentence card.
3. The first player draws one numeral card from the bag and states whether the number on the card is the one that completes the sentence. If it is, the player wins a point and returns the numeral card to the bag.
4. If the card does not show the number needed, the card is not returned to the bag and the next player draws a card from the bag. This continues until the correct number is drawn. Then all the cards are returned to the bag.
5. After each point is scored, the "referee" turns up a new addition card.
6. The player having the most points at the end of a given time is the winner.
7. Only the "referee" may refer to the sheet of completed addition sentences in case of disagreement.

### Demonstration Thermometer for page 65

Draw the outline of a thermometer on a large sheet of cardboard. Mark the scale from 10 or 20 below zero to 30 above zero.

Choose a piece of red ribbon and a piece of white ribbon such that each piece is slightly longer than the scale of the thermometer. Glue or sew one end of the red ribbon to one end of the white ribbon. Thread the free end of the white ribbon through a slit at the top of the thermometer and the free end of the red ribbon through a slit at the bottom of the thermometer. Fasten these two ends behind the cardboard to make the ribbon into a movable loop.

A temperature can be represented simply by moving the red edge to the appropriate mark on the scale.





## Unit 4 Overview

In this unit the writing and reading of two-place numerals, which were introduced in Unit 3, are extended to 99. Dimes and pennies are used to provide experiences with the coins and to reinforce the tens and ones features of two-place numerals. Ordering numbers to 100 includes naming numbers that occur before, after, and between other numbers. Several new topics are introduced in this unit, such as the calendar, counting by twos and by fives, time to the hour and to the half-hour, and the *quarter* as a coin worth 25 cents. Study of the calendar includes the number of months in a year, the number of days in a week, the names of the months and the days, and the sequences in which they occur. Counting by twos from zero introduces the *even numbers* and counting by twos from one results in the *odd numbers*. The skill of counting by fives from zero is developed and applied to counting nickels. This skill is then used in making change from amounts of 25 cents or less. Counting by tens from any number emphasizes the fact that the number of ones remains the same. Children are given experiences in both reading and recording times, to the hour and to the half-hour, on a dial clock. The new concepts and skills of the unit are assessed in the *Checkup*.

### Unit Outcomes

#### Number

- identify a set of tens and a set of ones and write the corresponding two-place numeral, numbers from 50 to 99
- order the numbers to 100
- complete patterns based on tens and on ones
- interpret two-place numerals
- identify numbers greater than or less than numbers to 100
- count by fives to 50
- count by twos to 20
- determine the missing addend in an addition fact, sums to 10
- complete basic addition and subtraction facts, sums and minuends to 10

#### Measurement

- know the months of the year and the days of the week; relate the calendar to everyday life
- determine the value of a set of dimes and pennies, amounts to 50 cents
- determine the dimes and pennies required for a given amount to 99 cents
- make change for 25 cents by counting on from a given amount
- tell and show time, to the hour and to the half-hour

#### Background

**Number:** In our base-ten system of numeration, place values are significant in all numerals that have more than one digit. Single digits are used to represent the numbers zero to nine, but numbers greater than nine require two or more digits. Since the base of the system is ten, the second place from the right is known as the *tens' place*. To interpret a two-place numeral it is necessary to recognize both the *face value* and the *place value* of each digit. For example, 57 and 75 have the same digits but their meanings are influenced by their place-value positions. In 57, the 5 represents 5 tens; in 75, the 5 represents 5 ones. The

importance of place value cannot be overemphasized and children need many opportunities to express two-place numerals in terms of tens and ones. Children who do not understand place value tend at a later stage to carry out operations with larger numbers on the basis of one digit at a time and have no appreciation of the values involved.

Counting by twos introduces several interesting and important concepts and skills. In counting by twos from zero, the *even numbers* are named and the digits 0, 2, 4, 6, 8 are repeated in the ones' place of each decade. In counting by twos from one, the *odd numbers* are named with the pattern 1, 3, 5, 7, 9 occurring in the ones' place. The combination of odd numbers and even numbers results in the complete set of whole numbers. Counting by twos from zero also names the multiples of two and lays a foundation for multiplication. By using sets of two objects, children can also learn to use the customary informal language of multiplication such as "4 twos are 8" and "6 twos are 12".

Ordering numbers to 99 and then to 100 is relatively easy provided that the transition is made from each decade to the next. Counting by tens can be used to emphasize the sequence of tens. Counting by fives reinforces the tens of our numeration system since every other number named is a multiple of ten. The alternating pattern of 5 and 0 in the ones' place of the numerals provides more evidence of the sound structure of our numeration system. Counting by tens, starting with five (5, 15, 25, . . .) is especially valuable in counting on to make change.

Review of the basic addition and subtraction facts having sums and minuends to 10 involves the use of number phrases. A number phrase uses two or more numerals to name a number. For example,  $5 + 3$ ,  $10 - 2$ ,  $8 \times 1$ ,  $16 \div 2$ ,  $2 \times 2 \times 2$  are just a few of the many number phrases that represent the number concept *eight*. When number phrases are joined using symbols such as  $=$ ,  $>$ , and  $<$ , number sentences are formed which, like sentences in grammar, tell stories—short stories about numbers:  $6 + 3 = 9$ ,  $8 - 4 > 2 + 1$ ,  $5 - 1 < 6$ . Knowing several names (number phrases) for the same number helps to develop flexible thinking in working with numbers.

**Measurement:** Many children will be familiar with the calendar and some of its uses. They will probably recognize the names of the months and the days of the week. Many of these names and the number of days in each month came to us from ancient times, especially from the earliest years of the Roman Empire. You may wish to explore some of these names with the children.

#### Teaching Strategies

The calendar is one of the most interesting charts used in everyday life and a teacher can guide children through a number of interesting mathematical activities. Cardinal and ordinal numbers are easily related by using a calendar, as both are represented by dates. November 3, for example, is the third day of the month, but it also indicates that three days in the month have elapsed (including that particular day). If one wishes to know the date one week later, seven is added to three for a sum of ten and the date November 10. The cardinal number ten can then be interpreted as an ordinal number to name the day as the tenth of November.

Special attention may need to be drawn to the fact that a month does not always start with a new week. A number strip can be a useful aid in showing that each month begins on the day

following the last one of the previous month. By associating names of days in sequence with dates toward the end of a month, the children will see that, since there are no missing days from one week to the next, there can be no days without dates. The date after the end of one month is the first of the next month.

| November |       |      |        |      | December |      |      |  |  |
|----------|-------|------|--------|------|----------|------|------|--|--|
| 26       | 27    | 28   | 29     | 30   | 1        | 2    | 3    |  |  |
| Mon.     | Tues. | Wed. | Thurs. | Fri. | Sat.     | Sun. | Mon. |  |  |
|          |       |      |        |      |          |      |      |  |  |
|          |       |      |        |      |          |      |      |  |  |

The children should also learn that a period of seven consecutive days is called *one week* and that it does not necessarily start with Sunday. A strip of paper seven units long and scaled to match the number strip can be placed along it to indicate a variety of periods each one week long, such as Tuesday to Monday, Thursday to Wednesday, Sunday to Saturday.

Understanding the place values in two-place numerals requires that children have experiences first in grouping objects by tens. For example, the symbol 32 for the number thirty-two takes on its full meaning when three groups of ten are formed and two single ones remain. Bundles of ten objects and abacus charts should be available for such activities so that the children can show the ones and the tens in the appropriate places. Note that the children can still see the ones in each group of ten, and "ten" does not take on a single identity having ten times the value of one. Therefore, a transition is necessary from the bundles of ten objects to a single object having the value of ten ones. For example, a red ticket worth ten might be exchanged for ten white tickets. This is an important step that is often overlooked in proceeding from objects in groups of tens and ones to numerals with a single digit in each place. The activities and exercises using dimes and pennies on pages 70 and 71 provide further experience in exchanging one "ten" (dime) for ten "ones" (pennies).

The number chart on page 72 shows the left-to-right arrangement of numerals in decades. The transition from 9 to 10, from 19 to 20, from 29 to 30, and so on, requires a return to the left of the chart and one row down. It is unlikely there will be any difficulty or break in the sequence of numbers if the children are reminded that this is the same situation that they find when reading stories; that is, when they come to the right end of a line, the story continues without a break at the left end of the next line. It may be worthwhile for children to see how a strip showing the numbers from 0 to 99 can be cut into ten-strips and pasted on a card to make a number chart.

The number chart is particularly useful for pointing out the patterns in counting by tens from any number. It is seen that the numbers stated belong in the same column and that the tens change, but the ones remain the same. For counting forward by tens the direction on the chart is down; for counting backward by tens the direction on the chart is up.

A play store is suggested so that children may have experiences in counting on by ones and fives to make change for a quarter. Activities in the play store should probably be scheduled for several days. The children should also be encouraged to use the play store in their free time.

For telling time, to the hour and to the half-hour, each child should have a clock face. Directions and suggestions for making

clock faces are given in the teaching suggestions for page 78. Since the children review counting by fives just prior to this topic, they can discover why 30 is indicated when the long hand reaches the 6 on the dial (as in 2:30), but emphasis need not be placed on the fives corresponding to the other numerals on the dial, since telling time at five-minute marks is developed fully in Unit 10.

## Materials

large calendar  
objects for grouping by tens, an abacus chart for each child  
flash cards for reviewing numbers to 75  
real money, play money, or coin cutouts from copies of page T327  
play store or store chart  
objects or pictures of objects showing prices to 99¢  
flash cards showing prices to 50¢  
several boxes containing 100 objects  
demonstration number line marked from 0 to 100  
copies of the number chart on page T333 for each child  
demonstration number chart  
cards and pipe cleaners for each child to make a flip chart  
cards showing the symbols > and <  
a number chart for 0 to 50 for each child  
special chart for making change for each child (See page T99.)  
a paper plate, metal fastener, and two cardboard hands for each child to make a clock face  
demonstration clock face, real clock  
flash cards for addition and subtraction facts having sums and minuends to 10

## Vocabulary

|                                 |                          |
|---------------------------------|--------------------------|
| calendar                        | time                     |
| year                            | clock                    |
| month                           | face                     |
| week                            | hand                     |
| names of the days of the week   | hour                     |
| names of the months of the year | o'clock                  |
| names of the numbers to 99      | half-past                |
| exchange                        | times for the half-hours |
| one hundred                     | pair                     |
| fives                           | even                     |
| quarter                         | odd                      |



## Unit 4 Theme – Fantasy

The purpose of this theme is to stimulate creativity and imagination, which are so much a part of the young child. It is hoped that the children will become aware of the close relationship between fact and fantasy. It is also hoped that from hearing stories of fantasy the children will appreciate this special form of literature.

Create a background for the children's work by draping a piece of pale, soft fabric to create an ethereal effect. Include books and pictures that will introduce the children to fantasy.

### LANGUAGE ACTIVITIES

#### 1. Discussing Fantasy

Introduce the word *fantasy* and discuss with the children their ideas of what the word means. Record the words that the children may suggest, for example, *pretend, magic, dreamlike, make-believe, unreal*. Establish the idea that fantasy is whimsical and lighthearted.

Have the children suggest things that may happen in a fantasy. Some examples are as follows:

- a. Birds and animals may talk.
- b. Things may be bigger or smaller than in real life.
- c. Things may be unusual colors.
- d. There may be characters such as witches and giants.
- e. People may live in castles, swamps, and other strange places.

Have the children make up and share fantasy situations. This would be an appropriate time to introduce hand puppets made of felt to the children.

#### 2. Listening to Fantasy

Many types of stories and poems fall into the category of fantasy. Fables, myths, legends, and fairy tales may all be considered part of the world of make-believe. Read a different type of fantasy story to the children each day. Choose stories of fantasy that originated in different countries around the world. In addition to the children's favorite books of fantasy, the following books will provide many appropriate stories.

##### Fables

*Fables of Aesop*, edited by Joseph Jacobs, published by Macmillan, Inc., in 1964.

*Brer Rabbit: Stories from Uncle Remus*, adapted by Margaret W. Brown, published by Harper & Row Publishers, Inc., in 1941.

##### Myths and Legends

*Myths and Legends of Many Lands*, compiled by Nicola A. Sissons, published by Lion Press in 1979.

*North American Legends*, edited by Virginia Haviland, published by Philomel Books in 1979.

##### Fairy Tales

*The Fairy Tale Treasury* by Virginia Haviland, published by Little, Brown & Company from 1961 to 1973. At this time there are nine books, one for each country, entitled *Favorite Fairy Tales Told in Denmark (India, Ireland, Italy, Japan, Norway, Scotland, Spain, Sweden)*.

*Tales of a Chinese Grandmother* by Frances Carpenter, published by Charles E. Tuttle Co., Inc., in 1972.

*Tales of a Korean Grandmother* by Frances Carpenter, published by Charles E. Tuttle Co., Inc., in 1972.

*Favorite Children's Stories from China and Tibet* by Lotta Carswell Hume, published by Charles E. Tuttle Co. Inc., in 1972.

*The White Cat and Other Old French Fairy Tales* by Marie C. D'Aulnoy, published by Macmillan, Inc., in 1967.

*Magic Animals of Japan* by Davis Pratt and Elsa Kula, published by Parnassus Press in 1967.

*The Talking Cat and Other Stories of French Canada* by Natalie Carlson, published by Harper & Row Publishers, Inc., in 1952.

After listening to a story, have the children check the elements of the story against their criteria for a fantasy. As the children hear more stories, they may wish to add other criteria to their list.

Have the children work in groups to illustrate the story for each day. Include a graph with each set of pictures to record individual responses to the story. These graphs will encourage the children to think critically about the enjoyment value of reading material and develop an awareness of their own tastes in literature. Encourage the children to expand on why they did or did not enjoy a particular story. Use the graphs to establish interest trends within your class.

#### 3. What Would You Do If . . . ?

Suggest fantastic situations to the children and have them describe what they would do in each instance. Some situations are suggested below.

- a. "What would you do if you met a dragon?"
- b. "What would you buy if you had a million dollars to spend?"
- c. "What would you ask for if a fairy granted you three wishes?"
- d. "What would you do if you found a magic wand?"
- e. "Where would you go if you suddenly grew a pair of wings and could fly?"
- f. "What would you do if you started to eat a boiled egg and it turned into a golden egg?"
- g. "What would you do if you found a pill that would cure any illness?"
- h. "What would you say if you were invited to go to the planet Mars in a flying saucer?"
- i. "What would you do if after eating an apple you started to become smaller?"

#### 4. Creating a Fantasy Story

Review the criteria for fantasy established through the preceding activities. Use these in developing a fantasy story. Have the children suggest several characters and a setting. Help them to create several sentences to begin the story and record these on a chart. Have each child complete the story with her/his own ending. Provide a sharing time so that the children may read and compare their stories. Make a book of the stories and include it in the fantasy display.

#### 5. New Fairy Tales

Obtain inexpensive copies of each of several well-known fairy tales. Cut out the illustrations showing significant events in

the stories. You will need two copies of each fairy tale so that if there is an illustration on the front and another on the back of one leaf, a copy of each illustration will be available. Mount these illustrations on Bristol board or on construction paper of different colors and laminate them.

Children can arrange the cards according to their interpretation of the story. Then they can tell the story, referring to the cards, if necessary, to remind them of the sequence of events they have chosen. Have other children discuss the "new" fairy tale and note any inconsistencies.

## 6. What's in a Name?

Ask the children to think about different objects in the classroom or at home and why the objects were given their names. For example, why is a book called a book? Would another name do just as well?

Have children give the names of things and then suggest another name for each. Make a list on chart paper of the children's suggestions. Lead the children to consider carefully the names they suggest; the names should not be merely silly concoctions.

## 7. Fantasy Dictionary

Stories of fantasy originate in different cultures and time periods. As a result, many unusual and unfamiliar words will appear in the stories. Discuss each of these words as they occur and encourage the children to provide meanings for the words. Make a class dictionary of fantasy words and record the meanings. Encourage the children to use this dictionary as a reference when writing their own stories.

# MATHEMATICS ACTIVITIES

## 1. Fantasy Buildings

From the stories that were read during listening time, make a list of all the dwellings or buildings mentioned in the stories, for example, huts, castles, mansions, cottages.

Have the children collect and bring to school cardboard tubes from rolls of paper towels and waxed paper, and discarded boxes and other containers of different sizes. Ask the children to sort the containers according to their geometric shapes and to determine of which shape there are the most (fewest). Challenge the children to discover how to use some of the boxes and containers to make shapes for roofs, pillars, turrets, and so on.

With the children working individually or in groups, have them select a building or a dwelling from the list prepared earlier. Using the shapes that have been collected and identified, have the children build structures of fantasy for the stories. The boxes can be joined with tape or white glue and covered with paint or construction paper.

## 2. Solving Problems

Have the children create, illustrate, and solve word problems suggested by some of the stories you read to them. You may wish to have them draw pictures that suggest joining and separating situations. These drawings can then be exchanged for interpreting and solving a problem.

Write number sentences on the chalkboard. Have children illustrate each number sentence by telling about a fantasy situation. For example, for  $5 - 2 = 3$ , a child might say, "There were five elves sitting on a toadstool. Two of the elves jumped off. Then there were three elves sitting on the toadstool."

# SCIENCE ACTIVITIES

## 1. Search for a Magic Bean

After reading the story *Jack and the Beanstalk*, discuss the possibility of finding a magic bean in a package of seeds. Allow each child to plant a bean in a Styrofoam or waxed-paper cup. Have each child keep a daily record on a personal calendar of the growth of her/his bean plant. Discuss whether there were any magic beans. The children may wish to write stories entitled "If I Had a Magic Bean".

## 2. Fairy Tale Snacks

In stories of fantasy, people and animals often ate strange things. For example, in the fairy tale *Hansel and Grettel*, Hansel ate a bit of the roof and Grettel ate a bit of the window of the cottage in which the old woman lived. Later, Grettel had to eat crab shells.

Have the children recall from the stories that you read to them some of the things that were eaten—things not usually considered a part of the diet of a person or an animal.

## 3. Space Fantasy

Read the following nursery rhyme to the children.

Hey, diddle, diddle,  
The cat and the fiddle,  
The cow jumped over the moon;  
The little dog laughed  
To see such sport,  
And the dish ran away with the spoon.

Mother Goose

The mystery of outer space has long been a source of fantasy. The moon, the sun, and the stars have stimulated our imagination for centuries and inspired superstition and customs. Read some myths or legends about space or the solar system. Encourage the children to discuss some of their fantasies about outer space.

Have the children create a space fantasy mural, using three-dimensional materials such as small boxes and paper tubes for making outer-space vehicles and creatures. Use sponge paintings or loosely packed tissue in shades of blue to make a background on mural paper. Mount the space vehicles and creatures on this background.

## 4. Fantastic Inventions

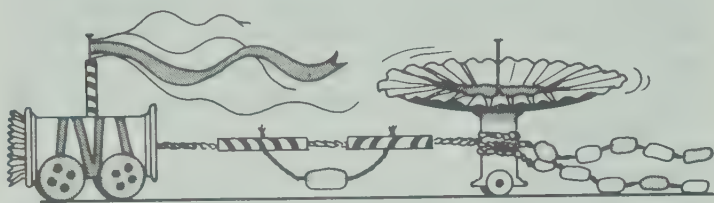
Many conveniences that we accept as part of our daily life were regarded with contempt and criticism in their early stages of development. The Wright brothers were told they would never get their "flying machine" off the ground; Henry Ford was scoffed at for his concept of a "horseless buggy". Discuss with the children the difficulties that inventors must face in having their ideas accepted.

Have the children collect scrap materials such as these:

|                 |                     |                  |
|-----------------|---------------------|------------------|
| balloons        | drinking straws     | popsicle sticks  |
| beads           | egg cartons         | seeds            |
| bottle caps     | fabric scraps       | shells           |
| boxes           | foil trays          | spools           |
| buttons         | gift-wrapping paper | stones           |
| cans            | nails               | string           |
| cardboard       | paper bags          | Styrofoam pieces |
| cardboard tubes | paper plates        | tissue paper     |
| coat hangers    | pipe cleaners       | toothpicks       |
| corks           | plastic cups        | wood scraps      |



Encourage the children to create fantastic inventions using these items. Have each inventor name the contraption and provide written instructions for its use.



## SOCIAL STUDIES ACTIVITIES

### 1. Fantasy Research

While fairy tales and other stories of fantasy offer enjoyment and pleasure as recreational reading, they also offer insight into the values and lifestyles of bygone times. Children can gain factual information based on the fiction of past societies and cultures.

Make a chart having the headings "Food", "Clothing", "Transportation", "Occupations", "Hobbies", and "Superstition".

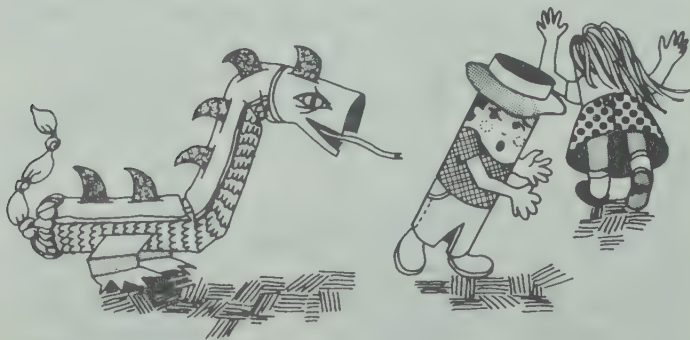
Have the children help to classify information from the stories that have been read. Discuss what they know about the people from this information.

Encourage each child to choose a fairy tale. Selections by Hans Christian Anderson, Aesop, or the Brothers Grimm would be suitable. After reading each story, have the children share what they have learned about life at that time. This information could be recorded to make a class book.

### 2. Fantasy People

Many of the characters in the stories that have been read to the children are purely imaginary. Make a list of all the characters who have appeared in the stories. Have the children identify which characters are imaginary and which characters are real. The imaginary characters may be fairies, giants, trolls, or dragons. Discuss the attitude toward royalty presented in the stories and the attitude we have today.

Divide the children into two groups. Have those in one group make fantasy characters and those in the other group make real people. Cardboard tubes such as those found in waxed paper or paper towels can be used for the bodies. Provide fabric scraps, yarn, paint, and glue. Place these two groups of people in the fantasy display. Encourage the children to compare the results.



## ART ACTIVITIES

### 1. Fantasy Flowers

Flowers of unusual shapes and colors are often used as background for illustrations of fantasy. Have the children experiment with these.

#### *Tissue-Paper Flowers*

Cut large petals from brightly colored tissue. Gather together the bottom of each petal and fasten the petals with a pipe cleaner. Spray the leaves lightly with water to give the tissue a mottled effect.

#### *Foil Posies*

Make four to six petal shapes from pipe cleaners. Cover each shape with foil. Crush the foil so that it has a rough texture. Use a felt marker to put color on each petal. Arrange the petals in a flower shape and fasten them with a pipe cleaner.

#### *Stained-Glass Bouquet*

Make wax shavings by grating broken crayons on a cheese grater. Sprinkle the shavings on waxed paper by single color or in a multicolored pattern. Cover with another sheet of waxed paper and press with a warm iron. Cut petals from this paper and arrange them to form a flower.

## MOVEMENT ACTIVITIES

### 1. Dance a Story

Read or adapt a story of fantasy such as *Twenty Thousand Leagues Under the Sea* by Jules Verne. Discuss the movements that would be involved in telling the story through dance. After the children have explored various types of creative movement, select a favorite part of the story. As you tell the story, have the children interpret it through body movements.

### 2. The Dragon Pass

Choose one child to play the part of a dragon. Arrange several chairs and a covering to form a cave for the dragon. The dragon watches from the "cave" as "tasty morsels" pass by.

Choose one child to stand at the approach to the "cave". Have all the other children stand in line behind the first child. As each child passes in front of the "cave", he/she must move in a way different from the children who went before. For example, if the first child skips in front of the "cave", the second child might hop, the third child might crawl, and so on. The dragon must watch carefully and remember all the movements. Any child who repeats a movement withdraws from the game.

## MUSIC ACTIVITIES

### 1. Musical Fantasy

Many well-known traditional pieces of music were conceived from notions of fantasy. Play excerpts from several compositions such as the *Nutcracker Suite*, *Peter and the Wolf*, *The Sorcerer's Apprentice*, and the *Flying Dutchman Suite*. Tell the story before playing the music. Encourage the children to follow the story through the music. Help them to identify the qualities of the music that create an illusion of fantasy.

### 2. Fantasy Sing-Along

Several popular stories of fantasy have been made into musicals. If possible, read the original story *Chitty Chitty Bang Bang: The Magical Car* by Ian Fleming or *Mary Poppins* by Pamela L. Travers. Follow this by playing a recording of songs from the musical. Ask the children to sing along.

# Unit 4

Page 67

## LESSON OUTCOME

Know the months of the year and the days of the week; relate the calendar to everyday life

## Materials

large calendar for display

## Vocabulary

calendar, year, month, week, names of the days of the week, names of the months of the year

## RELATED ACTIVITIES

- Assign a child to write the date on the chalkboard each morning. Also, have a child record the outdoor temperature each day. Prepare a chart for the current month large enough to illustrate the weather for each day.
- This would be an appropriate time to make a *Birthday Graph* if the children have not done so earlier. The children may help to tally how many children have a birthday in each month by repeating the following rhyme. Ask children to stand when their birthday month is named.

Apples, peaches, pears, and plums,  
Tell me when your birthday comes;  
January

After the number of birthdays for January is tallied, the children sit down and the rhyme is repeated, naming January and February. Each time repeat the months in sequence and include the next month.

| JANUARY |    |    |    |    |    |    | FEBRUARY |    |    |    |    |    |    | MARCH |    |    |    |    |    |    |
|---------|----|----|----|----|----|----|----------|----|----|----|----|----|----|-------|----|----|----|----|----|----|
|         |    |    |    |    | 1  | 2  |          | 1  | 2  | 3  | 4  | 5  | 6  |       | 1  | 2  | 3  | 4  | 5  | 6  |
| 3       | 4  | 5  | 6  | 7  | 8  | 9  | 7        | 8  | 9  | 10 | 11 | 12 | 13 | 7     | 8  | 9  | 10 | 11 | 12 | 13 |
| 10      | 11 | 12 | 13 | 14 | 15 | 16 | 14       | 15 | 16 | 17 | 18 | 19 | 20 | 14    | 15 | 16 | 17 | 18 | 19 | 20 |
| 17      | 18 | 19 | 20 | 21 | 22 | 23 | 21       | 22 | 23 | 24 | 25 | 26 | 27 | 21    | 22 | 23 | 24 | 25 | 26 | 27 |
| 24      | 25 | 26 | 27 | 28 | 29 | 30 | 28       |    |    |    |    |    |    | 28    | 29 | 30 | 31 |    |    |    |
| 31      |    |    |    |    |    |    |          |    |    |    |    |    |    |       |    |    |    |    |    |    |

| APRIL |    |    |    |    |    |    | MAY |    |    |    |    |    |    | JUNE |    |    |    |    |    |    |
|-------|----|----|----|----|----|----|-----|----|----|----|----|----|----|------|----|----|----|----|----|----|
|       |    |    |    |    | 1  | 2  |     |    |    |    |    |    | 1  |      | 1  | 2  | 3  | 4  | 5  |    |
| 4     | 5  | 6  | 7  | 8  | 9  | 10 | 2   | 3  | 4  | 5  | 6  | 7  | 8  | 6    | 7  | 8  | 9  | 10 | 11 | 12 |
| 11    | 12 | 13 | 14 | 15 | 16 | 17 | 9   | 10 | 11 | 12 | 13 | 14 | 15 | 13   | 14 | 15 | 16 | 17 | 18 | 19 |
| 18    | 19 | 20 | 21 | 22 | 23 | 24 | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 20   | 21 | 22 | 23 | 24 | 25 | 26 |
| 25    | 26 | 27 | 28 | 29 | 30 |    | 23  | 24 | 25 | 26 | 27 | 28 | 29 | 27   | 28 | 29 | 30 |    |    |    |
|       |    |    |    |    |    |    | 30  | 31 |    |    |    |    |    |      |    |    |    |    |    |    |

| JULY |    |    |    |    |    |    | AUGUST |    |    |    |    |    |    | SEPTEMBER |    |    |    |    |    |    |
|------|----|----|----|----|----|----|--------|----|----|----|----|----|----|-----------|----|----|----|----|----|----|
|      |    |    |    |    | 1  | 2  |        |    |    |    |    |    | 1  |           | 1  | 2  | 3  | 4  |    |    |
| 4    | 5  | 6  | 7  | 8  | 9  | 10 | 3      | 4  | 5  | 6  | 7  | 8  | 9  | 5         | 6  | 7  | 8  | 9  | 10 | 11 |
| 11   | 12 | 13 | 14 | 15 | 16 | 17 | 10     | 11 | 12 | 13 | 14 | 15 | 16 | 12        | 13 | 14 | 15 | 16 | 17 | 18 |
| 18   | 19 | 20 | 21 | 22 | 23 | 24 | 15     | 16 | 17 | 18 | 19 | 20 | 21 | 19        | 20 | 21 | 22 | 23 | 24 | 25 |
| 25   | 26 | 27 | 28 | 29 | 30 | 31 | 22     | 23 | 24 | 25 | 26 | 27 | 28 | 26        | 27 | 28 | 29 | 30 |    |    |
|      |    |    |    |    |    |    | 29     | 30 | 31 |    |    |    |    |           |    |    |    |    |    |    |

| OCTOBER |    |    |    |    |    |    | NOVEMBER |    |    |    |    |    |    | DECEMBER |    |    |    |    |    |    |
|---------|----|----|----|----|----|----|----------|----|----|----|----|----|----|----------|----|----|----|----|----|----|
|         |    |    |    |    | 1  | 2  |          |    |    |    |    |    | 1  |          | 1  | 2  | 3  | 4  |    |    |
| 3       | 4  | 5  | 6  | 7  | 8  | 9  | 7        | 8  | 9  | 10 | 11 | 12 | 13 | 5        | 6  | 7  | 8  | 9  | 10 | 11 |
| 10      | 11 | 12 | 13 | 14 | 15 | 16 | 14       | 15 | 16 | 17 | 18 | 19 | 20 | 12       | 13 | 14 | 15 | 16 | 17 | 18 |
| 17      | 18 | 19 | 20 | 21 | 22 | 23 | 21       | 22 | 23 | 24 | 25 | 26 | 27 | 19       | 20 | 21 | 22 | 23 | 24 | 25 |
| 24      | 25 | 26 | 27 | 28 | 29 | 30 | 28       | 29 | 30 |    |    |    |    | 26       | 27 | 28 | 29 | 30 | 31 |    |
| 31      |    |    |    |    |    |    |          |    |    |    |    |    |    |          |    |    |    |    |    |    |

The calendar

(sixty-seven) 67

## LESSON ACTIVITY

### Before Using the Page

- Teach the children the song given on page T107 to familiarize them with the names of the months of the year in order.
- Have the children name the days of the week in order. Ask what day comes before and what day comes after days that you name at random.

### Using the Page

- Ask the children if they can tell you what the page shows. Many of them will be able to tell you that there is a calendar for the year. You may wish to discuss some of the things that occur in different months of the year; for example, school closes in June and opens in September.
- Have the children find the current month on the page. Have them locate the number for today. Ask them what other numbers for this month are on the same day as today. Ask how many days there are in this month, and then ask them to find other months of the year that have the same number of days as this month. Have them find months of the year that have a different number

of days from this month. Then read the poem on page T107 to reinforce the number of days in each month. Make a list of the names of the months that have 30 days, 31 days, and 28, or sometimes, 29 days.

- Reinforce the ordinal number concepts by asking questions such as, "What is the first month of the year?" and "Which month is July?"
- Have the children mark special days on the calendar, for example, their birthdays, Valentine's Day, New Year's Day, Halloween, and, if applicable, Christmas, Yom Kippur, Easter.



LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding two-place numeral, numbers from 50 to 75

Materials

objects for grouping by tens, flash cards for reviewing numbers to 50, abacus chart for each child

Vocabulary

names of the numbers to 75

RELATED ACTIVITIES

• Have the children play the game “Clean the Pot” in groups of two to six players. You will need at least 50 counters for each player and a die marked 4, 5, 6, 7, 8, 9. Place all the counters in a “pot”. The children take turns tossing the die and removing counters from the “pot” according to the number on the die. Each player builds up a pile of counters. When the “pot” is empty, each player groups the counters into piles of ten and counts how many tens and how many single ones there are. The player with the greatest number of counters is the winner.

Complete.



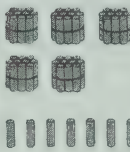
| tens | ones |
|------|------|
| 5    | 1    |

51



| tens | ones |
|------|------|
| 6    | 2    |

62



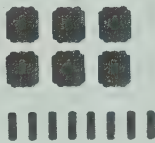
| tens | ones |
|------|------|
| 5    | 7    |

57



| tens | ones |
|------|------|
| 6    | 4    |

64



| tens | ones |
|------|------|
| 6    | 8    |

68



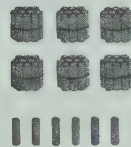
| tens | ones |
|------|------|
| 7    | 0    |

70



| tens | ones |
|------|------|
| 7    | 3    |

73



| tens | ones |
|------|------|
| 6    | 6    |

66



| tens | ones |
|------|------|
| 7    | 5    |

75



| tens | ones |
|------|------|
| 5    | 9    |

59

68 (sixty-eight)

Representing numbers to 75 using tens and ones

LESSON ACTIVITY

Before Using the Page

- Rote count with the children to 50.
- Prepare flash cards that show a standard numeral on one side and the corresponding number of tens and ones on the reverse side for reviewing the numbers to 50. Display the numeral side of a card chosen at random and ask how many tens and ones there are. Repeat many times. Then display the side showing the number of tens and ones and ask what number is represented. Repeat many times.

|    |
|----|
| 46 |
|----|

|               |
|---------------|
| 4 tens 6 ones |
|---------------|

- Rote count with the children from 50 to 75. Write the numerals for these numbers on the chalkboard and have the children identify them. You may prefer to hang numeral tags for 1 to 75 on the number board and refer to these. (See page T322.)

- If the children made the abacus charts suggested in *Related Activities* on page T75, have them use these now. If the charts were not made at that time, you may wish to make them for this lesson.

Have the children use their objects for grouping by tens to show the numbers from 50 to 75 on the abacus charts. Each time a number is represented, have the children state the number of tens and the number of ones. You may wish to have children write the standard numeral on the chalkboard as each number is considered.

- You may wish to have the children work in pairs, using their abacus charts and objects for grouping by tens. One child places some tens and ones on her/his chart. The partner identifies the number shown. Then the children change roles.

Using the Page

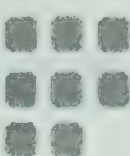
- Discuss the first exercise with the children. Ask them why there is a 5 in the tens' place and a 1 in the ones' place and what number is represented. Have them trace over the dotted numerals. Discuss the second exercise and then let the children work independently.

Complete.



| tens | ones |
|------|------|
| 7    | 6    |

76



| tens | ones |
|------|------|
| 8    | 4    |

84



| tens | ones |
|------|------|
| 8    | 0    |

80

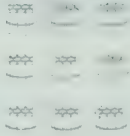
| tens | ones |
|------|------|
| 9    | 2    |

92



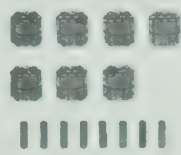
| tens | ones |
|------|------|
| 7    | 8    |

78



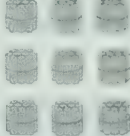
| tens | ones |
|------|------|
| 9    | 7    |

97



| tens | ones |
|------|------|
| 8    | 1    |

81



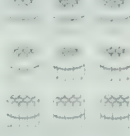
| tens | ones |
|------|------|
| 9    | 9    |

99



| tens | ones |
|------|------|
| 8    | 3    |

83



| tens | ones |
|------|------|
| 9    | 5    |

95

Representing numbers to 99 using tens and ones

(sixty-nine) 69

## LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding two-place numeral, numbers from 75 to 99

### Materials

objects for grouping by tens, flash cards for reviewing numbers to 75, abacus chart for each child

### Vocabulary

names of numbers to 99

## RELATED ACTIVITIES

- Have children play the game "Crosses and Rings" in small groups of four to six players. You will need large sheets of paper, pencils, and crayons. Have each player make as many X's as possible in a two-minute interval. At the end of the two minutes, ask each player to ring the X's in groups of ten. If more than 10 tens are formed, have the players use a different color to draw a ring around 10 tens. After the children have drawn all the rings, show the number of X's drawn beside each child's name on the chalkboard. Ask questions such as, "Who drew the greatest number of X's?" "How many tens did John ring?" "Who has fewer than 10 tens?" "Who has single ones that are not ringed?"
- Extend the set of flash cards for the numbers from 1 to 75 to include the numbers to 99. Use these to review the concept of tens and ones.

## LESSON ACTIVITY

### Before Using the Page

- Extend the set of flash cards suggested on page T90 from 50 to 75. Use these to review tens and ones for numbers to 75.
- Ask what number comes after 75. Rote count with the children from 76 to 99. Write the numerals from 76 to 99 on the chalkboard or use numeral tags on the number board. Have the children identify the numerals.
- Have the children use their abacus charts and objects for grouping by tens to represent numbers to 99. Each time a number is represented, ask the children to state the number of tens and the number of ones.
- If the demonstration number line has not yet been extended to show the numbers to 99, have the children help to do this now.
- You may wish to have the children work in pairs, using their abacus charts and objects for grouping by tens. One child places some tens and ones on her/his chart. The partner identifies the number shown. Then the children change roles.

Keep in mind that the use of a variety of objects for grouping by tens will help to prevent the children from associating grouping with only one particular kind of object.

### Using the Page

- The children should be able to complete the page without any preliminary discussion. As for page 68, they are to show the number of tens and the number of ones and then write the standard numeral.



LESSON OUTCOME

Determine the value of a set of dimes and pennies, amounts to 50 cents

Materials

real money, play money, or coin cutouts from copies of page T327, play store or store chart, objects with tags showing prices to 50¢, flash cards showing prices to 50¢

Vocabulary

exchange

RELATED ACTIVITIES

• The children may play the game “Dime Trade” in groups of two to four players. You will need pennies, several dimes, and five regular dice. The first player rolls the dice and looks to see whether there are any numbers that occur more than once, for example, the numbers rolled may be 2, 4, 4, 4, 5. Players may claim only those numbers that are repeated; so, the claim would be 12 for the three 4’s. The player would claim 12 pennies and exchange 10 pennies for one dime. If the dice show more than one number repeated, for example, 2, 2, 1, 1, 1, the player has her/his choice and would obviously prefer two 2’s. Play continues until one player reaches 100, the equivalent of ten dimes. To be declared the winner, a player must count her/his winnings by tens.

How much ?

27 ¢

44 ¢

33 ¢

18 ¢

26 ¢

50 ¢

35 ¢

42 ¢

70 (seventy)

Working with dimes and pennies, amounts to 50 cents

LESSON ACTIVITY

Before Using the Page

- Review the terms *penny*, *nickel*, *dime*, and their values one cent, five cents, and ten cents. Review counting by tens from 0 to 90 and from 90 to 0.
- Have children work with different numbers of pennies and group them into piles of ten. Each pile of 10 pennies may be exchanged for one dime. Have the children record their results as shown.

| Pennies | Dimes and Pennies |   | Cents |
|---------|-------------------|---|-------|
| 34      | 3                 | 4 | 34¢   |
| 17      | 1                 | 7 | 17¢   |

- Use the play store or the store chart. Label objects with tags showing prices to 50¢. Ask each child to buy an object. Have the children pay for the objects using only dimes and pennies, and establish that they are to give the exact amount in payment. If a child uses more than 9 pennies to make the payment, help

her/him to exchange the pennies for dimes first. This activity helps the children to relate these coins to their experiences with tens and ones.

- Prepare flash cards showing various prices to 50¢. Indicate on the reverse side of each card the number of dimes and the number of pennies that correspond to that price.

Display a price. Have the children state the corresponding number of dimes and number of pennies. Repeat several times to help the children realize that the numeral itself may be used to obtain the answer. At first, if some children want to use their pile of dimes and pennies to obtain the answer, let them.

Using the Page

- Ask a child to read the question at the top of the page and interpret what is required. Discuss the first exercise with the children. Ask them to count the dimes and the pennies. Then have the children count in unison saying, “Ten, twenty, twenty-one, . . . , twenty-seven.” Have them trace over the dotted 27. Note that the children are not required to write the symbol ¢. Then let the children work independently.

## LESSON OUTCOME

Determine the dimes and pennies required for a given amount to 99 cents

## Materials

real money, play money, or coin cutouts from copies of page T327, objects or pictures of objects showing prices to 99¢, special work sheet for each child, sheet of paper for each child

## RELATED ACTIVITIES

- For each exercise on the page, discuss the number of dimes and the number of pennies not used and the value of these coins together.
- From catalogues and newspapers, have the children cut out pictures of items priced at less than one dollar. Have them paste these onto a sheet of paper and indicate the coins that would be used to pay for each item.
- Have the children work in pairs to play the game "Show Me". They will need 9 dimes and 9 pennies for either of the following procedures:
  1. One child states an amount (to 99¢) and the partner shows coins for that amount.
  2. One child places a number of coins in front of the partner who states the amount of money shown.
- Encourage children to continue using the play store in their spare time. They may bring new items from home to add variety to the store.

Mark the coins not needed.

Working with dimes and pennies, amounts to 99 cents

(seventy-one) 71

## LESSON ACTIVITY

### Before Using the Page

- Display an object or a picture of an object showing any price from 51¢ to 99¢. Have the children determine the number of dimes and the number of pennies needed to pay for the item. Repeat several times. As a variation, let the child who gives the correct answer keep the item that was displayed and ask her/him to select the next item to be sold.
- Prepare a work sheet of a chart as shown. Display items showing prices clearly marked. Have the children copy the price and draw the dimes and pennies needed to pay for the item.

|     |             |             |
|-----|-------------|-------------|
| 34¢ | 10¢ 10¢ 10¢ | 1¢ 1¢ 1¢ 1¢ |
|     |             |             |
|     |             |             |

- Give each child a sheet of paper. Have the children draw small circles as quickly as possible within a two-minute interval. At the end of the two minutes, ask the children to group the circles into tens, that is, to find how many dimes could be obtained in exchange for the "pennies" they drew. Have them write their answers to indicate the number of dimes and the number of single pennies.

### Using the Page

- Read the instruction to the children. Emphasize the words "not needed". Ask children to read the eight prices shown. Ask how many dimes are needed for the first price. Have the children count: "Ten, twenty, thirty, forty, fifty" as they indicate the dimes that are needed, and then have them cross out the dimes not needed. Repeat the procedure for the pennies needed and not needed. Ask how many dimes and pennies were not needed. Ask how much money was not needed. Let the children complete the remaining exercises independently. After they have finished, ask which amount of money showed the exact number of coins needed (88¢).



## LESSON OUTCOME

Order the numbers to 100

### Materials

several boxes containing 100 objects

### Vocabulary

one hundred

## RELATED ACTIVITIES

- You may wish to distribute copies of the chart given on page T333 and have children investigate other patterns obtained from coloring. For example, have them start at 5 and color inside every fifth square to show multiples of five, or start at 0 and color inside every second square to show the even numbers. Coloring inside all the squares for numbers having 4 tens shows numbers in the same row. Coloring inside all the squares for numbers having 6 ones shows numbers in the same column.

- If the demonstration number line has not yet been extended to 100, do so now and have the children refer to it as they respond to questions of the following types: "What number comes before 54? after 69? between 79 and 81?"

Complete

Show the numbers.

| After           | Before          | Between         |
|-----------------|-----------------|-----------------|
| 10 11 <u>12</u> | <u>74</u> 75 76 | 20 <u>21</u> 22 |
| 33 34 <u>35</u> | <u>28</u> 29 30 | 59 <u>60</u> 61 |
| 24 25 <u>26</u> | <u>40</u> 41 42 | 72 <u>73</u> 74 |
| 67 68 <u>69</u> | <u>79</u> 80 81 | 96 <u>97</u> 98 |
| 88 89 <u>90</u> | <u>52</u> 53 54 | 65 <u>66</u> 67 |

72 (seventy-two) Order of the numbers to 100

## LESSON ACTIVITY

### Before Using the Page

- Ask the children what number comes after 99. Show them how to write the numeral 100 and the name *one hundred*. Start at 10 and count by tens to 100. Ask how many tens are needed to reach 100.
- Divide the class into several small groups and provide each group with a box of small objects (beads, blocks, pencils, cards) to be counted. Each box should contain 100 objects. Give the children in each group time to count how many objects there are in their box and observe how they decide to do this. Some children will count by ones to 100. Others will apply the concept of grouping by tens and share the task of grouping, and then count by tens to 100. This kind of activity provides the children with a situation where grouping has a practical application.
- Have the children count by ones according to instructions similar to the following:
  - "Start at 30 and count to 45."
  - "Start at 63 and count to 72."
  - "Start at 88 and count to 100."

- Name a number, say, 44. Have children use the word *after* to tell about the number, for example, "44 comes after 43." Repeat for the word *before* ("44 comes before 45"). Then ask them to use the word *between* ("44 comes between 43 and 45").

### Using the Page

- Have the children write the missing numbers to complete the sequence to 100. Discuss the second part of the page so that the children will understand that they are to supply the missing number for each sequence of three numbers.
- After the children have completed the page, have them mark on their number charts according to these instructions:
  - "Print an A beside the number that comes before 32."
  - "Print a B beside the number that comes after 66."
  - "Print a C beside the number that comes between 85 and 87."
  - "Ring the number that tells how many days there are in a week."
  - "Ring the number that tells how many months there are in a year."
  - "Mark an X on all the numbers that show 3 tens."
  - "Color red all the multiples of ten."

## LESSON OUTCOME

Complete patterns based on tens and on ones

### Materials

a copy of the number chart on page T333 for each child, demonstration number line

### RELATED ACTIVITIES

- Because the symbols  $>$  and  $<$  will be used on page 75, you may wish to review these now and have the children write the appropriate symbol between the pairs of numbers in the exercises at the bottom of page 73, where they are stating numbers one greater than or one less than a given number.

- Have the children play the game "Snakes and Ladders" according to the usual rules, but make the following change. Prepare a set of instruction cards that state directions similar to these:

Go to the number before 62.

Go to the number after 39.

Go to the number between 65 and 67.

If a player lands on a colored square, an instruction card must be drawn and the instruction followed. The winner is the first player to reach 100.

Count by tens.

|           |           |           |
|-----------|-----------|-----------|
| 10        | 5         | 3         |
| 20        | 15        | 13        |
| 30        | 25        | 23        |
| <u>40</u> | <u>35</u> | <u>33</u> |
| <u>50</u> | <u>45</u> | <u>43</u> |
| <u>60</u> | <u>55</u> | <u>53</u> |
| <u>70</u> | <u>65</u> | <u>63</u> |
| <u>80</u> | <u>75</u> | <u>73</u> |
| <u>90</u> | <u>85</u> | <u>83</u> |
| 100       | 95        | 93        |

Complete the patterns.

|    |    |    |           |           |
|----|----|----|-----------|-----------|
| 29 | 30 | 31 | <u>32</u> | <u>33</u> |
| 86 | 87 | 88 | <u>89</u> | <u>90</u> |
| 37 | 38 | 39 | <u>40</u> | <u>41</u> |
| 54 | 44 | 34 | <u>24</u> | <u>14</u> |
| 68 | 58 | 48 | <u>38</u> | <u>28</u> |
| 95 | 85 | 75 | <u>65</u> | <u>55</u> |
| 2  | 12 | 22 | <u>32</u> | <u>42</u> |
| 6  | 16 | 26 | <u>36</u> | <u>46</u> |
| 37 | 47 | 57 | <u>67</u> | <u>77</u> |

What number is one greater?

|    |           |
|----|-----------|
| 30 | <u>31</u> |
| 49 | <u>50</u> |
| 54 | <u>55</u> |
| 78 | <u>79</u> |
| 89 | <u>90</u> |
| 25 | <u>26</u> |

What number is one less?

|           |    |
|-----------|----|
| <u>69</u> | 60 |
| <u>51</u> | 52 |
| <u>36</u> | 37 |
| <u>90</u> | 91 |
| <u>18</u> | 19 |
| <u>73</u> | 74 |

Patterns with tens and ones to 100

(seventy-three) 73

## LESSON ACTIVITY

### Before Using the Page

- Give one copy of the number chart on page T333 to each child. Assign a different starting number from 0 to 9 to each child. Starting at that number, he/she is to count by tens and color the tenth number each time. Ask children to read their number patterns. For example, starting from 7 the pattern would be 7, 17, 27, . . . , 97. Write the numerals on the chalkboard and ask the children if they see a pattern in these numbers. Then write the sequences of numbers obtained by other children. Ask what the pattern is when 10 is added to a number.
- Ask the children to add 10 to numbers you name at random and to state the resulting numbers. If necessary, they may refer to their number charts.
- Assign starting numbers from 90 to 99, have the children count backward by tens and color every tenth number. Record the patterns obtained for several starting numbers. For 93, for example, the pattern would be 93, 83, 73, . . . , 13, 3. Ask the children if they see a pattern and try to elicit from them what the pattern is.

- Ask the children to subtract 10 from numbers you name at random and to state the resulting numbers. If necessary, they may refer to their number charts.
- Have the children refer to the demonstration number line or to their number charts. Ask questions similar to the following: "What number is one greater than 47?" "What number is one less than 61?"

### Using the Page

- For each of the three columns of numbers at the left, have the children read the numbers and state the pattern for the numbers. Then have the children write the numbers to complete each of the patterns.  
For the first sequence at the right, ask what the pattern is. Have the children trace over the dotted 32 and then complete each of the sequences. Note that the first three sequences increase by ones, the next three increase by tens, and the last three decrease by tens.
- Read the two instructions for the remaining exercises and then let the children work independently.



## LESSON OUTCOME


Demonstrate an understanding of two-place numerals

### Materials

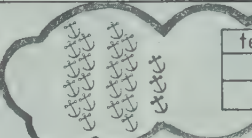
an abacus chart for each child, objects for grouping by tens, a copy of page T333 for each child, demonstration number chart

### RELATED ACTIVITIES

- Have the children use their number charts to color the squares that show numerals having the same number of tens and ones; that is, 11, 22, 33, . . . , 99.



| tens | ones |
|------|------|
| 3    | 2    |
| 32   |      |



| tens | ones |
|------|------|
| 2    | 3    |
| 23   |      |

Ring the numerals that have 5 in the tens' place.

(51) 45 (57) 85 35

Ring the numerals that have 8 in the tens' place.

78 (89) 18 (81) (84)

Ring the numerals that have 9 in the tens' place.

(90) 9 39 19 (98)

Ring the numerals that have 3 in the ones' place.

(43) 32 (53) 38 (73)

Ring the numerals that have 7 in the ones' place.

71 (27) 78 (67) (37)

Ring the numerals that have 4 in the ones' place.

(54) 45 (34) (94) (4)

What number is ten greater?

|    |           |  |
|----|-----------|--|
| 15 | <u>25</u> |  |
| 31 | <u>41</u> |  |
| 4  | <u>14</u> |  |
| 22 | <u>32</u> |  |
| 50 | <u>60</u> |  |
| 29 | <u>39</u> |  |
| 73 | <u>83</u> |  |
| 68 | <u>78</u> |  |
| 87 | <u>97</u> |  |
| 46 | <u>56</u> |  |

What number is ten less?

|           |    |
|-----------|----|
| <u>65</u> | 75 |
| <u>16</u> | 26 |
| <u>39</u> | 49 |
| <u>50</u> | 60 |
| <u>42</u> | 52 |
| <u>74</u> | 84 |
| <u>23</u> | 33 |
| <u>87</u> | 97 |
| <u>1</u>  | 11 |
| <u>68</u> | 78 |

74 (seventy-four)

Understanding two-place numerals

## LESSON ACTIVITY

### Before Using the Page

- Have each child use an abacus chart and objects for grouping by tens. Write the sequence 4, 14, 24, 34, 44, 54, 64, 74, 84, 94 on the chalkboard. Have the children represent 4 on their abacus charts. Ask them how many tens and how many ones they used. Have them include more objects to represent 14 and question them again. Continue through the sequence in this way to enable the children to see that one ten is added each time to the tens' place while the ones' place does not change.
- Repeat the activity above using the sequence 92, 82, 72, 62, 52, 42, 32, 22, 12, 2 to enable the children to see that one ten is removed each time from the tens' place while the ones' place does not change.
- Have a child use the objects for grouping by tens to represent the number 47. Have another child represent the number that is ten greater and then write the numeral on the chalkboard. Have a child represent the number that is ten less than 47 and write the numeral on the chalkboard. Discuss the results.
- Display several groups of ten and single ones. Have the

children use their objects to show the number that is ten greater than and then the number that is ten less than the given number.

- Distribute a copy of the number chart on page T333 to each child. Use a larger chart for demonstration. Ask the children to find a numeral on their charts that has 2 in the tens' place and to color the square. Have each of several children tell you the number chosen. Color the square for that number on the demonstration chart. If any numbers have been omitted, have the children determine whether more squares should be colored. Discuss the pattern. Ask how many numerals have 2 in the tens' place. Have each child color her/his chart to show all the squares for numerals that have 2 in the tens' place. Then follow a similar procedure for locating all the numerals that have 4 in the ones' place.

### Using the Page

- Discuss the first example at the top of the page. Ask how many tens are shown, how many ones are shown, and what number is represented. Discuss the second example in a similar way.

Help the children to interpret the instructions for the exercises and then let them work independently.

## LESSON OUTCOME

Identify numbers greater than or less than numbers to 100

## Materials

demonstration number line, objects for grouping by tens, a sheet of paper for each child, cards and pipe cleaners for each child to make a flip chart, cards showing the symbols  $>$  and  $<$

## RELATED ACTIVITIES

- You may wish to continue some of the activities suggested in *Before Using the Page*.
- After the children have completed the page, you may wish to have them write the symbol  $>$  or  $<$  between the eighteen pairs of numbers on page 75 to show how the numbers in each pair are related.

Ring to show which number is greater

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 24 | 21 | 37 | 32 | 63 | 66 |
| 48 | 45 | 80 | 89 | 43 | 53 |
| 35 | 25 | 70 | 60 | 49 | 99 |

Check to show which number is less

|      |    |      |      |      |      |
|------|----|------|------|------|------|
| 26 ✓ | 62 | 75   | ✓ 57 | 36 ✓ | 63   |
| 49 ✓ | 94 | 87   | ✓ 78 | 20   | ✓ 19 |
| 24 ✓ | 33 | 76 ✓ | 79   | 64   | ✓ 57 |

Write  $<$  or  $>$

|           |           |            |
|-----------|-----------|------------|
| 32 $>$ 22 | 61 $>$ 59 | 45 $<$ 65  |
| 73 $<$ 78 | 55 $<$ 60 | 80 $>$ 78  |
| 54 $<$ 67 | 96 $>$ 69 | 100 $>$ 96 |

Identifying numbers greater than or less than numbers to 100 (seventy-five) 75

## LESSON ACTIVITY

## Before Using the Page

- Review the concepts *greater than* and *less than* with the children. Ask questions similar to the following:
  - “What number is one greater than 57? one less than 57?”
  - “What number is two greater than 19? two less than 19?”
  - “What number is three greater than 85? three less than 85?”
- Have one child use the objects for grouping by tens to represent the number 62. Have another child represent the number 29. Ask the other children which number is greater and why. Help them to concentrate on the number of tens used for representing each number. Repeat for other pairs of numbers.
- Give each child a sheet of paper. Have the children draw a representation of tens and ones to show the number 25 and another to show the number 41. Ask them which number is greater and why. Repeat for different numbers.
- Repeat the activities above for the concept *less than*.
- Help the children to prepare their own flip charts like the one described on page T107. Have the children use their flip charts to respond to instructions such as:

“Show 47. Show 52. Show 30.”

“Show a number that has 2 in the tens’ place.”

“Show a number that has 5 in the ones’ place.”

“Show the number that is one greater than 52.”

“Show the number that is one less than 73.”

- Review the meanings of the symbols  $>$  and  $<$ . Have children use their flip charts to show a number of their own choosing. Ask two children to place their charts on the chalkboard ledge. Ask a third child to place the appropriate symbol card between the two charts to show how the numbers are related.

## Using the Page

- Discuss the first example at the top of the page. Ask how many tens and how many ones are shown for each number. Ask what two numbers are represented. Have children state how the two numbers are related. Discuss the second example in a similar way.

Read each of the three instructions with the children and discuss the first exercise in each set. Then let the children work independently.



## LESSON OUTCOME

Count by fives to 50

### Materials

a number chart for 0 to 50 for each child, real money, play money, or coin cutouts from copies of page T327

### Vocabulary

fives

### RELATED ACTIVITIES

- Display objects or pictures of objects showing prices in multiples of five to 50 cents. Have children tell how many nickels would be needed to pay for each object.

Show pictures of objects that have no prices. Tell the children that you paid for one using three nickels and ask them how much it cost. Tell them that you paid for one using two nickels, another using one dime, and a third using ten pennies. Have the children discuss the prices paid.

- Have the children play the game "Money Bingo" in groups of two to four players as described on page T107.

Count by fives. Show the nickels needed.

| Complete. |             |
|-----------|-------------|
| Nickels   | How much ?  |
| 1         | <u>5</u> ¢  |
| 2         | <u>10</u> ¢ |
| 3         | <u>15</u> ¢ |
| 4         | <u>20</u> ¢ |
| 5         | <u>25</u> ¢ |
| 6         | <u>30</u> ¢ |
| 7         | <u>35</u> ¢ |
| 8         | <u>40</u> ¢ |
| 9         | <u>45</u> ¢ |
| 10        | <u>50</u> ¢ |

76 (seventy-six)

Counting by fives to 50

## LESSON ACTIVITY

### Before Using the Page

- Give each child a copy of a number chart for 0 to 50. Have them mark an X inside the square for 0, count on five squares and mark an X inside that square, count on five more and mark an X inside that square, and continue to the end of the sequence. Then have the children write the sequence of numbers that were marked, that is, 0, 5, 10, . . . , 50. Have them read the numbers in the sequence forward and backward. Then see if they can repeat the numbers in each direction, without looking at their charts.

Write the sequence on the chalkboard, but omit three or four of the numbers. Have children show the missing numbers. Repeat several times.

- Review the terms *penny* and *nickel* and their values. Ask the children to tell of the two ways they could pay for an item that costs 5 cents. Print the word *nickel* on the chalkboard and have the children read it.

- Have children group 50 pennies into ten stacks with five pennies in each stack. As you move the stacks together into a single

group, have the children count by fives to 50. Then place the stacks in a row. As you place a nickel in front of each stack, have the children count by fives.

- Give each child a different number of nickels (to 10). Have them count by fives to determine the value of all the nickels; for example, "Five cents, ten cents, fifteen cents" for three nickels.

Ask children to use nickels to show coins worth 35 cents. Ask one child to demonstrate this to the group. Repeat for other amounts.

- Display different numbers of nickels. Ask children to state the amount of money shown.

### Using the Page

- Read the instructions to the children. Ask how many nickels there are in each row. Have the children trace over the dotted 15 for the three nickels. Have them write the other multiples of five that are missing on the number line. Then have the children draw the nickels required to show the amounts. The children may refer to the rows of nickels for help in completing the table.

## LESSON OUTCOME

Make change for 25 cents by counting on from a given amount

### Materials

real money, play money, or coin cutouts from copies of page T327, special chart for making change for each child, objects or pictures of objects having tags showing prices to 25¢

### Vocabulary

quarter

### RELATED ACTIVITIES

- You may wish to discuss the exercises for which more than one way of making change is possible.
- Have the children determine the value of each set of coins not used for each purchase on the page.
- Prepare a work sheet of items showing prices to 25¢. Have the children draw coins to show the possible ways of paying for each item.
- If you have a play store, let the children shop for items showing prices less than 25¢. Each child should use quarters and should receive the appropriate coins in change. After each item is purchased, it should be recorded on the chart used earlier.

Count on to make change for 25 cents. *Answer will vary.* quarter 25 cents 25¢

|   |  |  |
|---|--|--|
| 17¢<br>  | <br>18 19 20 25 |             |
| 21¢<br>  | <br>22 23 24 25 |  |
| 15¢<br>  |  | <br>25      |
| 10¢<br>  | <br>15 20 25    |  |
| 7¢<br>   | <br>8 9 10      | <br>15 25   |
| 13¢<br> | <br>14 15      | <br>25     |
| 9¢<br> | <br>10        | <br>15 25 |

Making change, amounts to 25 cents




(seventy-seven) 77

## LESSON ACTIVITY

### Before Using the Page

- Draw a number line for 1 to 25 on the chalkboard. Have children count by ones to 25 and by fives to 25. Ring the numerals on the number line for counting by fives. Start at 17 and ask a child to count by ones to 25. Have another child start at 10 and count by fives to 25. Continue with other examples.
- Review the penny, nickel, dime, and their values. Give each child some pennies, nickels, and dimes. Have the children show the coins they would use to pay for something that costs 10¢, and discuss the various ways. Repeat for 15¢, 22¢, and then 25¢. Ask if anyone knows of a way to use just one coin to pay for something that costs 25¢. Provide real quarters for children to examine. Emphasize that the value of the quarter is twenty-five cents. Print the word *quarter* on the chalkboard and write 25¢ beside it.
- Give each child a copy of a chart like the one shown. Display an object or a picture of an object showing the price 16¢. Have the children pretend to buy the object using a quarter. Have them draw the object or print its name and indicate the price. Draw a

similar chart on the chalkboard. Count on with the children, starting at 17 and stopping at 20. Refer to the number line if necessary. Draw a penny for each number. Then ask how much more is needed to reach 25 and what coin would show this. Complete the example. Repeat for other objects having different prices.

|  |  |
|--|--|
| I have  25¢ |  |
| I buy  | I have left  |
|  16¢          |  9¢ |
|  | 17 18 19 20 25   |

### Using the Page

- Read the instruction to the children. Ask what the price of the car is. Have the children count on and trace over the dotted numerals as they count. Then have them trace over the two dotted rings to show the coins needed. Have the children follow a similar procedure for the other exercises.



## LESSON OUTCOME

Tell and show time, to the hour

### Materials

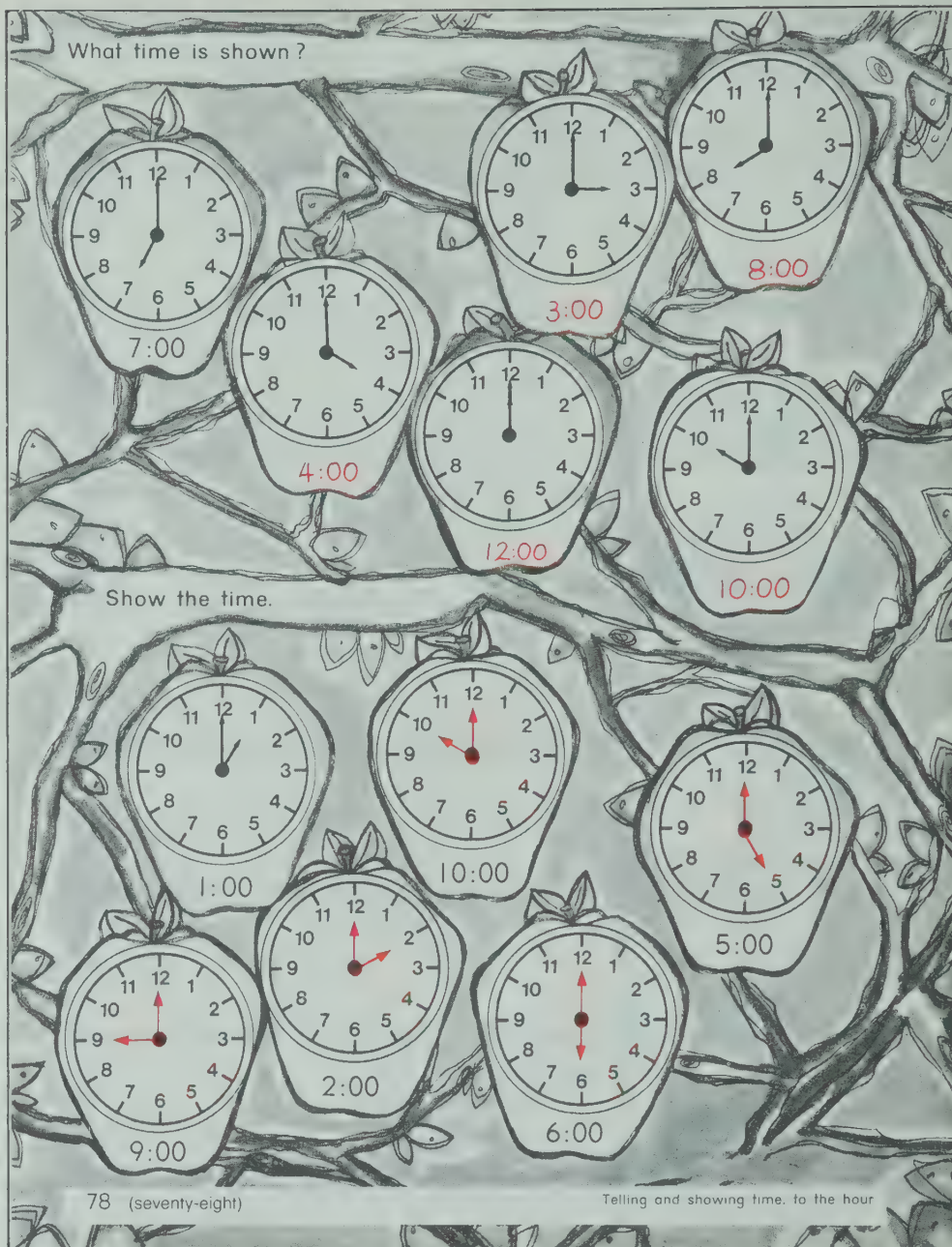
paper plate and metal fastener and two cardboard hands for each child, real clock, demonstration clock face, chart paper

### Vocabulary

time, clock, face, hand, hour, o'clock

## RELATED ACTIVITIES

- There will be children who need more practice in showing time, to the hour. Use copies of page T337 for these extra activities.
- Have the children work in small groups using the clock faces they made during the lesson. Have the children take turns showing times on their clock faces and holding them up for the other children to identify.
- Have children decide on their favorite hour of the day. Ask them what they do in that hour and why it is their favorite hour.
- Ask the children to note throughout the day when the classroom clock shows a time, to the hour, and to tell you the time.



## LESSON ACTIVITY

### Before Using the Page

- In preparation for this lesson, help the children to make their own clock faces. Give each child a paper plate on which you have marked the positions for the numerals 12, 3, 6, 9. Have the children mark these numerals on the clock face first and then mark the remaining numerals. Give each child two cardboard hands and a metal fastener for attaching the hands to the paper plate so that they will move.
- Ask the children to observe the two hands of the classroom clock. Ask how they are different. You may wish to introduce the names *minute hand* and *hour hand*, but use the terms “long” hand and “short” hand in discussions.

Begin with a time that is familiar to the children, for example, 9 o'clock. Ask them what usually happens at 9 o'clock in the morning. Use a real clock and a large demonstration clock face to show 9 o'clock. Ask the children to tell you where the long hand points and where the short hand points. Have the children show 9 o'clock on their clock faces. Repeat the activity for several different times, to the hour. Each time the children show

a time on their clock faces, have them hold up the clock faces for you to see the positions of the hands.

- Have some children show times on their clock faces and hold them up for the other children to identify.
- Help the children to prepare a chart showing the words and the numerals for each hour. Print “1 o'clock” and read it to the children. Then write 1:00 in the second column. As you continue the chart have the children do some of the printing.
- Point to “3 o'clock” on the chart prepared in the previous activity. Have the children show that time on their clock faces. Repeat for other hours, using a time from either column of the chart.

### Using the Page

- Read the two instructions to the children. For the first part of the page, discuss how the children are to show the numeral for the time shown on each clock face. For the second part of the page, have them trace over the dotted hands on the first clock face and state the time shown. Remind the children to distinguish between the short hand and the long hand as they show the time on each clock face.



What time is shown?



Telling time to the half-hour

(seventy-nine) 79

## LESSON OUTCOME

Tell time, to the half-hour

### Materials

paper-plate clock face for each child,  
real clock, demonstration clock face

### Vocabulary

half-past, times for the half-hours: one  
thirty, two thirty, three thirty, . . . ,  
twelve thirty

## RELATED ACTIVITIES

- Make a set of 24 cards, each card having a clock face showing time, to an hour or to a half-hour. The reverse side of each card should show the time in numerals. Children may work with these cards in their spare time.
- Have the children play the game "What Time Is It?" described on page T107.
- Some children have difficulty reading the hour hand for times to the half-hour. They are uncertain, for example, whether the time is 2:30 or 3:30 when the hour hand is between the 2 and the 3. It may be helpful to emphasize the hour that the hour hand has just passed. If the clock face shows 2:30, for example, say, "The long hand points to the 6. The short hand has just passed the 2. The time is 'half-past two' or 'two thirty'".

## LESSON ACTIVITY

### Before Using the Page

- If some children already know how to tell time, to the half-hour, they should form a group and after a very brief review proceed to the exercises on pages 79 and 80. For those children who have not learned to tell time, to the half-hour, the following activities are suggested.
- Review the procedure of telling and showing time, to the hour. State times, to the hour, and have the children show them on their clock faces from the previous lesson. Then show times, to the hour, on the demonstration clock face and have the children state the times. Review where the long hand points and where the short hand points.
- For this activity you should use a real clock because it has synchronized hands. Start at 1 o'clock. Ask the children what time is shown. Slowly move the minute hand in a clockwise direction until the hands show 2 o'clock. Ask what time is shown now. Continue in this way to show other times, to the hour. Ask what happens to the short hand as the long hand moves round the face.

- Show 8 o'clock on the real clock. As you move the minute hand slowly, have the children count by fives until they say "thirty" to correspond to the 6. Point out that the long hand moved halfway round the clock face and the short hand moved to halfway between 8 and 9. Tell the children that this time is read "half-past eight" or "eight thirty". Have the children show "eight thirty" on their clock faces.

Have the children watch as you begin at 9 o'clock and move the hands on the real clock to show "nine thirty". Tell them it is "half-past nine" or "nine thirty". Show other times and have children state the time in two ways.

- Write times, to the half-hour, on the chalkboard, starting with 1:30. Have children read them in turn. Name times to the half-hour, and ask children to write them on the chalkboard, while the other children show the times on their clock faces.

### Using the Page

- Discuss the first two times with the children and point out how the position of each hand has changed from the first clock face to the second clock face. Have the children record the time shown on each of the other clock faces.



## LESSON OUTCOME

Show time, to the hour and to the half-hour

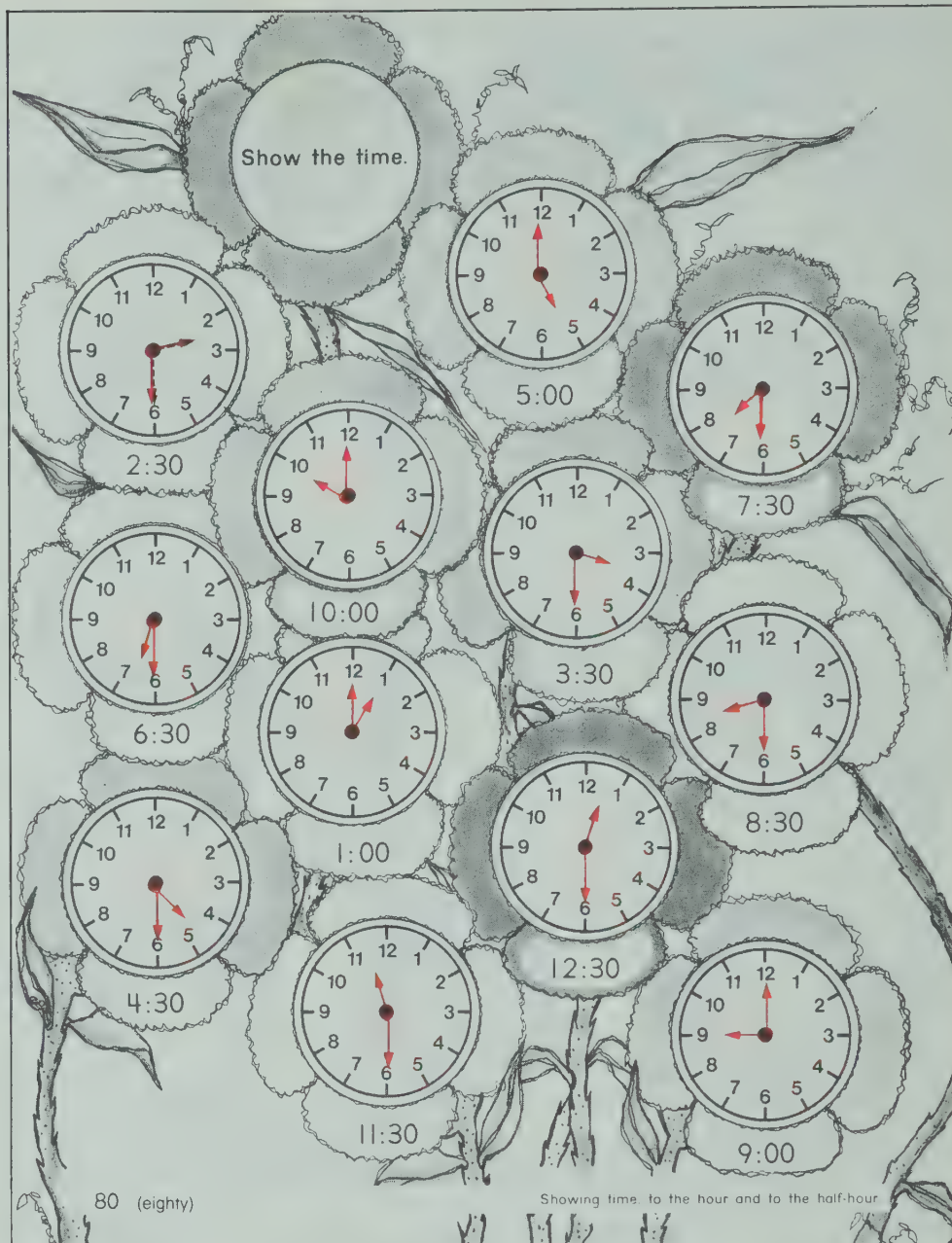
### Materials

demonstration clock face, real clock, paper-plate clock face for each child

## RELATED ACTIVITIES

- Children may work in pairs using their paper-plate clock faces. One child shows a time on the clock face and the other child states the time shown. Instead, one child may state a time and the other child may show it on the clock face.

- Prepare work sheets from copies of page T337. Have the children draw hands on the clock faces to show times they prefer. Have them write the numerals for the times on separate small cards and place them in an envelope pasted to the back of the sheet. The children may play alone or with a partner, drawing in turn a card from the envelope and matching it with the clock face showing the same time.



## LESSON ACTIVITY

### Before Using the Page

- Start at 1, point to the numerals, in turn, on the large demonstration clock face, and count by fives to 60. Move the minute hand slowly from 1 round the clock face and have the children count by fives to 60. Remind the children that when the minute hand goes halfway round the clock face, the number 30 is associated with the 6.
- Review how the short hand moves as the long hand moves once round the clock face. Ask how far the short hand moves.

Show 4 o'clock on the real clock. Move the minute hand to indicate the half-hour. Ask how much of its journey the long hand has completed. Ask how far from one number to the next the short hand has moved in the half-hour. Ask the children to state where the long hand is and where the short hand is. Discuss why the short hand is not pointing directly to a numeral. Show other times, to the half-hour, and repeat the questions about the positions of the hands.

- Use the demonstration clock face to show times, to the half-hour. Have children read these times and then show them on

their paper-plate clock faces. Have the children hold up their clock faces for you to check.

- State certain times, to the hour and to the half-hour, and have the children show the times on their clock faces. Have them hold up their clock faces for you to check.

### Using the Page

- Direct the children's attention to the clock face showing 2:30. Ask where the short hand points and why. Have the children trace over the short hand. Ask where the long hand points and why. Have the children trace over the long hand. Then have them draw the hands on each clock face to show the time indicated. Remind them to distinguish between the short hand and the long hand as they show the time on each clock face.

# LESSON OUTCOME

Count by twos

## Materials

number line, a sheet of paper for each child, a copy of the number chart on page T333 for each child

## Vocabulary

pair, even, odd

## RELATED ACTIVITIES

- If children live in a city or a town, they may be able to determine whether the houses on one side of a street are identified with even numbers or odd numbers. Apartments on each floor of an apartment building often are numbered so that those with even numbers are along one side of the corridor and those with odd numbers are along the other side.
- Have the children cut pictures from magazines and catalogues of things that come in pairs. Mount the pictures on chart paper. Point to each of the pairs in turn and have the children count by twos from 2.

Start at 0 and jump by twos.

Start at 1 and jump by twos.

Complete.

Start at 2, count by twos, and join the dots.

Start at 1, count by twos, and join the dots.

Counting by twos

(eighty-one) 81

## LESSON ACTIVITY

### Before Using the Page

- Begin by discussing objects that come in *pairs*, for example, socks, shoes, mittens, eyes, ears, hands, feet.
- Have the children count by twos on the number line on the chalkboard. Start at 0, skip 1 and jump to 2, skip 3 and jump to 4, skip 5 and jump to 6, and so on, to 20. Have the children record the numbers that were touched, that is, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.



- Repeat the above activity, but have the children start at 1, skip 2 and jump to 3, skip 4 and jump to 5, and so on, to 19. Have the children record the numbers that were touched, that is, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19.

- Give each child a copy of the number chart on page T333. Have them color the square for 0, skip 1, color the square for 2, skip 3, and so on; that is, color the multiples of two. Have them observe the pattern and print the digits in sequence that appear in the ones' place for all the numbers that were colored. The pattern that emerges is 0, 2, 4, 6, 8, 0, 2, 4, 6, 8, and so on. The children will have colored the *even* numbers and noted the pattern of the ones' digits.
- Have the children refer to the number chart from the preceding activity. Ask them to print the digits in sequence that appear in the ones' place for all the numbers that were not colored. The pattern that emerges is 1, 3, 5, 7, 9, 1, 3, 5, 7, 9, and so on. This sequence will help them identify the *odd* numbers.

### Using the Page

- Read the instructions to the children. Discuss what is required in each case. Encourage the children to say the numbers silently as they complete each sequence.



## OBJECTIVE

Add and subtract, sums and minuends to 10

## Materials

flash cards for addition and subtraction facts having sums and minuends to 10

## RELATED ACTIVITIES

- Prepare several one-minute tests of addition facts having sums to 10.
- Children may play the game "What's in a Name" for two to six players. You will need a game board for each player. Each game board should show a variety of addition and subtraction phrases, six in all, for sums and minuends to 10. You will also need 50 numeral cards: two cards showing 0, three cards showing 1, and five cards for each of 2, 3, 4, 5, 6, 7, 8, 9, and 10.

The rules for the game are given on page T107.

Sample game boards

|          |         |
|----------|---------|
| $3 + 3$  | $7 + 2$ |
| $5 + 3$  | $6 - 4$ |
| $10 - 7$ | $9 - 3$ |

|           |         |
|-----------|---------|
| $10 - 10$ | $6 + 2$ |
| $2 + 4$   | $4 + 3$ |
| $9 - 7$   | $7 - 3$ |

Ring the numbers that are greater.

6 4 9

$6 - 2$   $10 - 2$

$4 + 3$   $2 + 7$   $4 + 6$

$7 + 1$   $7 - 4$   $5 + 3$

$9 - 3$   $4 + 5$   $7 - 5$

$10 - 5$   $1 + 9$   $2 + 8$

$6 + 4$   $1 + 5$   $3 + 4$

$2 + 6$   $1 - 1$

Ring the numbers that are less.

8 7 10 5

$6 + 3$   $2 + 4$   $9 + 1$   $1 + 6$

$2 - 1$   $3 - 2$   $3 + 5$   $10 - 8$

$10 - 6$   $9 - 7$   $8 - 3$   $5 - 3$

$5 + 2$   $6 - 4$   $7 - 6$   $4 - 4$

$7 + 3$   $4 + 4$   $7 + 2$   $3 + 3$

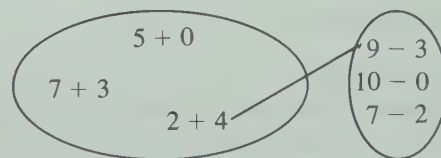
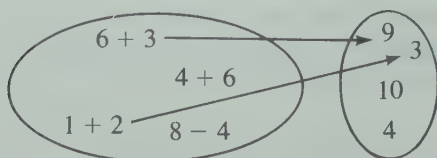
82 (eighty-two)

Addition and subtraction practice sums and minuends to 10

## LESSON ACTIVITY

### Before Using the Page

- Use flash cards with the children to reinforce addition and subtraction facts having sums and minuends to 10.
- Ask the children what number is named by  $8 - 2$ . Ask the children for other names for the number six. Encourage them to use both addition and subtraction phrases. Repeat for other numbers.
- On the chalkboard, write sets of addition and subtraction phrases and numerals similar to those shown. Have the children draw arrows to match an addition phrase or a subtraction phrase for a number from one set with a numeral or a phrase for that number in the other set.



- Write pairs of addition and subtraction phrases on the chalkboard. Have children tell which phrase represents the greater number and which represents the lesser number.

$4 + 5$   $6 + 2$   $9 - 8$   $6 - 1$

### Using the Page

- Read the instruction for the first part of the page to the children. Ask what number is shown at the top of the first tree. Ask what number is represented by  $4 + 3$  and why the numeral is ringed. Proceed in a similar way for the four other phrases on the tree. Have the children trace over the three dotted rings. Then let the children complete the three other exercises.

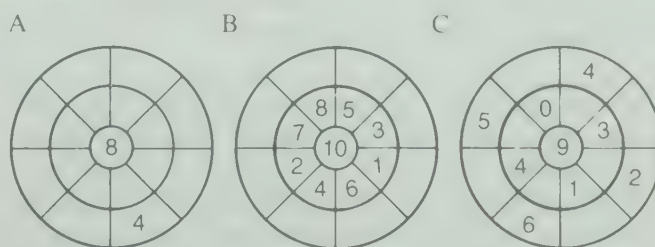
Read the instruction for the second part of the page and ask children to tell what they are to do. Have the children ring the correct phrases.

|   |   |    |
|---|---|----|
| 2 | 3 | 5  |
| 1 | 4 | 5  |
| 3 | 7 | 10 |

|   |   |   |
|---|---|---|
|   |   |   |
| 4 | 1 | 3 |
|   |   | 8 |

- Draw a number wheel as shown (B). Note that the first addends are missing. Say, "A number plus four equals ten. What is the number?" Have a child show the number in the first ring. Repeat for each of the other numbers in the wheel.

- If there are children who still need counters to find the answers, let them use them. Otherwise, encourage the children to think without this aid.



- Because of the nature of the activities in *Before Using the Page*, the children should be able to complete the number wheels without any further discussion.



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## Materials

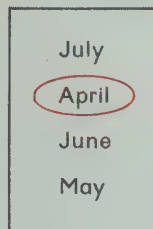
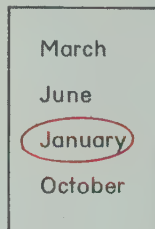
real money, play money, or coin cutouts from copies of page T327, demonstration clock face, paper-plate clock face for each child, a flip chart for each child (See page T107.)

## RELATED ACTIVITIES

- Play the game "Ten and Ten Again" for two or more players described on page T107.

Ring the month that comes first.

How much ?



43 ¢

Complete.

24 25 26 27 28 29 30 31 32

14 24 34 44 54 64 74 84 94

5 10 15 20 25 30 35 40 45

2 4 6 8 10 12 14 16 18

Ring the numerals that have 6 in the tens' place.

36 65 60 86

Ring the numerals that have 2 in the ones' place.

42 24 2 20

What number is ten greater ?

38 48

What number is ten less ?

62 72

Write < or >.

36 > 32

92 > 29

48 < 53

What time is shown ?



4:00



7:30

Show the time.



3:30

84 (eighty-four)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- Review the names of the months of the year by having the children sing the song on page T107. Ask questions about which month comes before or after a given month. Review the names of the days of the week.
- Review the values of the penny, nickel, dime, and quarter. Display sets of coins (no quarters) and have the children determine the value of each set. The amounts should not exceed 99 cents.
- Review telling and showing time, to the hour and to the half-hour. Use the demonstration clock face and have the children use their paper-plate clock faces.
- Have the children start at 2 and count by twos, start at 5 and count by fives, and start at 10 and count by tens.
- Review the following concepts by having the children use their flip charts that were prepared for page 75. Give instructions similar to the following and have the children respond by showing each numeral on their flip charts.

"Show the number that comes before 61."

"Show the number that comes after 87."

"Show the number that comes between 30 and 32."

"Show the greater number of the pair 52 and 37."

"Show the lesser number of the pair 58 and 82."

"Show the number that is 10 greater than 27."

"Show the number that is 10 less than 83."

"Show a number that has 6 as the tens' digit."

"Show a number that has 4 as the ones' digit."

### Using the Page

- Direct the children's attention to the word *Checkup* at the bottom of the page. Review the purpose of this page. Read each instruction with the children to ensure that they know what they are to do. Let the children work independently while you help those who are having difficulty.

## Games and Activities

### Song for page 67

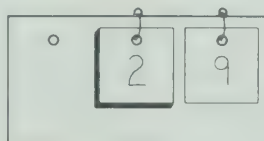


### Poem for page 67

Thirty days have September,  
April, June, and November.  
All the rest have thirty-one,  
Excepting February alone,  
Which has but twenty-eight days clear,  
And twenty-nine in each leap year.

### Flip Chart for page 75

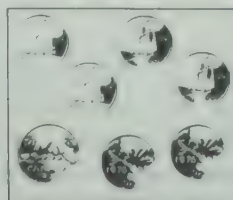
Each child will need a stiff card for a base, two pipe cleaners, and two sets of numeral cards for 0 to 9. Each numeral card should have a hole punched in the top. The card for the base will need three holes (to show hundreds later) punched at the top. Have the children assemble each set of cards in the proper sequence and use a pipe cleaner to attach each set of cards to the base.



### Money Bingo (Game for page 76)

#### Materials

large cards showing pictures of sets of coins (pennies, nickels, and dimes) having values to 99¢  
bingo cards showing amounts of not more than 99¢  
markers for the bingo cards



Coin Card

|     |     |
|-----|-----|
| 13¢ | 92¢ |
| 47¢ | 28¢ |
| 50¢ | 77¢ |

Bingo Card

#### Rules

1. The leader displays the coin cards, one at a time.
2. Each player determines the amount of money shown and places a marker on the corresponding amount, if shown, on the bingo card.
3. The player who first has six markers on her/his bingo card calls "Bingo", is declared the winner, and becomes the leader for the next round.

### What Time Is It? (Game for page 79)

The leader says, "I am thinking of a clock. The long hand is pointing to the 6 and the short hand is pointing halfway between the 3 and the 4. What time is it?" The other children use their paper-plate clock faces to show the time and determine how to read it. A player who states the correct time becomes the leader and the procedure is continued.

As a variation, the leader may say, "It is half-past five (or five thirty). Move the hands on your clock face to show the time."

### Rules of the game for page 82

Each player takes a game board. The numeral cards are shuffled and placed face down. Players take turns taking the top numeral card and placing it on one phrase on her/his game board if it corresponds. If it does not correspond, the numeral card is placed in a discard pile. The player who first covers the six phrases on her/his game board is the winner. If all the numeral cards have been used before a winner is determined, the pile is reshuffled and turned face down to be used again.

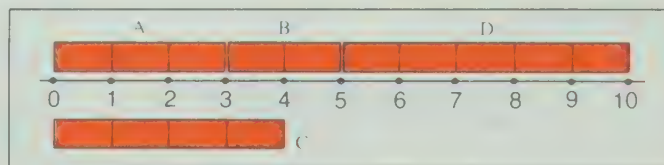
### Ten and Ten Again (Game for page 84)

#### Materials

two dice—one marked 0, 0, 1, 2, 3, 4, and the other marked 1, 1, 2, 3, 4, 5  
a number line showing from 0 to 10 for each player  
three sets of strips from one to nine units in length, where the units correspond to those on the number line, for each player

#### Rules

1. Each player in turn tosses the dice, finds the sum of the two numbers, chooses the strip that corresponds to the sum (if the dice show 2 and 1, the strip three units long is needed), and places the strip on the number line.



2. As the game continues the players place strips on the number line in an attempt to complete a ten-strip.
3. If a strip cannot be used to complete a ten-strip, it forms the beginning of a new ten-strip.
4. At the end of a given time, the player with the most ten-strips completed is the winner.

The results of throw A were 2 1; the results of throw B were 0 2; the results of throw C were 1 3; the results of throw D were 3 2. Because the strip for throw D could be used to complete a ten-strip, it was used to replace strip C. Strip C was placed in readiness for making another ten-strip.



## Unit 5 Overview

This unit begins with a review of reading temperatures above zero on a Celsius scale and then temperatures below zero are introduced. The major emphasis of the unit is given to discovering sets of basic addition facts for the sums 11, 12, 13, and 14. After each set of addition facts has been developed, the related subtraction facts are presented and follow-up practice exercises include both types. These basic facts are also applied in exercises using amounts of money to 14 cents and in simple word problems with sums and minuends to 14. Linear measurement using non-standard units of length is reintroduced by having children select suitable units to use for measuring different lengths. A standard unit, the *metre*, is then presented and exercises are provided for children to estimate and measure lengths in metres. Six different three-dimensional shapes are studied—the cone, cube, cylinder, sphere, rectangular prism, and triangular prism. Children are directed to recognize these solids in common objects in the environment, and then to discover their properties, namely, the number of faces and the shapes of the faces of each solid. The *Checkup* at the end of the unit provides an assessment of children's abilities to deal with the topics presented in the lessons.

### Unit Outcomes

#### Number

- complete addition facts for sums of 11, 12, 13, and 14
- complete related basic addition and subtraction facts, sums of 11, 12, 13, and 14
- add and subtract amounts of money, to 14 cents
- write a number sentence for a story problem and answer the question of the problem
- complete basic addition and subtraction facts, sums and minuends to 14

#### Measurement

- read and show temperatures above and below zero
- recognize suitable non-standard units of length
- measure length using a ruler marked in non-standard units
- measure length in metres
- estimate length in metres; measure to check an estimate of length

#### Geometry

- recognize three-dimensional shapes (cone, cube, cylinder, sphere, rectangular prism, triangular prism)
- recognize properties of three-dimensional shapes

### Background

**Number:** Every “teen number”, as well as the numbers 11 and 12, can be considered one ten and some ones. In this unit the ten in the numbers 11, 12, 13, and 14 is emphasized by presenting the numbers initially as  $10 + 1$ ,  $10 + 2$ ,  $10 + 3$ , and  $10 + 4$ , respectively. With this foundation of “ten plus ones” the children can determine the “teen number” sums by making groups of ten and counting the extra ones. For example, they can join and rearrange 8 objects and 5 objects to form a set of 10 objects and 3 objects and so discover that the sum of 8 and 5 is 13.

In this book the emphasis is on the basic facts (each of the two addends is less than 10). Number sentences such as  $10 + 2 = 12$  and  $14 - 3 = 11$  are considered extensions of basic facts. For example, the basic addition fact  $0 + 2$  leads to the extensions  $10 + 2 = 12$ ,  $20 + 2 = 22$ ,  $30 + 2 = 32$ , and so on; the basic subtraction fact  $4 - 3 = 1$  leads to the extensions  $14 - 3 = 11$ ,  $24 - 3 = 21$ ,  $34 - 3 = 31$ , and so on.

In partitioning a set into two groups, if the groups have different numbers of members there are four related addition and subtraction facts. If the groups have the same number of members, there are only two related basic facts.

In partitioning sets to discover the basic addition and subtraction relationships for sums and minuends from 11 to 18, there should be nine or fewer members in any one group. As the sum or the minuend increases, the number of different facts decreases. Whereas a sum of 11 requires four pairs of addends and the commutative property of addition doubles this number to eight basic addition facts, only one pair of addends is needed for a sum of 17 or 18. The task of learning many basic facts becomes relatively easy if the “families” approach, using the commutative property of addition and the inverse relationship between addition and subtraction, is applied to a comparatively few pairs of numbers.

| 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 2,9 | 3,9 | 4,9 | 5,9 | 6,9 | 7,9 | 8,9 | 9,9 |
| 3,8 | 4,8 | 5,8 | 6,8 | 7,8 | 8,8 |     |     |
| 4,7 | 5,7 | 6,7 | 7,7 |     |     |     |     |
| 5,6 | 6,6 |     |     |     |     |     |     |

The work on word problems begun in Unit 3 is extended here to include sums and minuends to 14. As before, the children are expected to write the number sentence that represents each situation. As stated earlier, identification of the correct operation to use is the most critical step in solving word problems; and the children need as much experience as possible in this regard. Several approaches are outlined in the suggestions for teaching the pages of the unit.

**Measurement:** In Unit 3 the children considered temperatures above zero; in this unit they become acquainted with temperatures below zero. Activities can be designed to provide the children with opportunities to read temperatures at school and at home.

The metre is introduced in this unit for measuring length and distance. Prior to using the metre the children use a non-standard unit, the paper clip, to construct a ruler. (See page 91.) By doing this themselves they come to realize the convenience of having a graduated device to measure objects without having to count each unit of length. Since the decimal system is the dominant feature of the metric system, it is suggested that the children make their paper rulers ten units long.

**Geometry:** Our surroundings include many three-dimensional objects both regular and irregular in shape, for example, buildings, boxes, appliances, and furniture. In this unit the children have experiences identifying objects that suggest the shape of the cone, cube, cylinder, rectangular prism, triangular prism, and sphere, and they learn to recognize characteristic properties of each. Some flexibility in naming is permissible, especially for the prisms.

In Unit 2 the rectangle, square, triangle, and circle were introduced and these two-dimensional shapes are now associated with the faces of the three-dimensional shapes. Other properties that are investigated include whether the three-dimensional shapes can be rolled or stacked. Some shapes can be included in both groups; for example, the cylinder, which will stack when placed on end and roll when placed on its side. A cube, on the other hand, can only be stacked.

## Teaching Strategies

Although the exercises in the book provide some practice in the basic addition and subtraction facts, certain children will require more practice in order to master the facts. Various practice materials are suggested in *Related Activities* for the lessons. One of the simplest ways of ensuring practice for both the addition and subtraction facts is by providing one "starter" and having the children provide all the related facts. If given the "starter"  $7 + 4 = \dots$ , the children would provide the following facts:

$$\begin{array}{ll} 7 + 4 = 11 & 4 + 7 = 11 \\ 11 - 4 = 7 & 11 - 7 = 4 \end{array}$$

Subtraction sentences can also be used as "starters".

It is important that the children have the required amount of practice to achieve mastery of the basic facts. To determine individual needs and to group children with similar needs, various test procedures can be used, both oral and written. Facts may be presented orally or by using flash cards and the children can respond by using their number concept cards (multiple-response method) or by writing the numerals. These techniques are easy to use, but they leave no record of what facts were tested and what responses each child gave, for checking later and planning review procedures. Oral responses take less time, but often only one child at a time is tested. If exercises are written on the chalkboard, the children may either copy and complete the facts or write only the answers. This method does provide a record of items and responses, but note that some of the errors may be caused by copying incorrectly. If children are left on their own to complete test exercises, note those children who resort to manipulative devices such as counting on their fingers. Since these are time-consuming, the children may not have time to try all the exercises.

One very effective procedure requires sheets of test exercises on which children write their responses at a rate that the teacher sets by reading the exercises aloud, while the children follow on their copies. This procedure provides a record of the exercises and the answers, and ensures that the responses are made by recall rather than by slower methods. The test is diagnostic in nature because the responses made are either correct or incorrect, and any unanswered exercises indicate slowness of recall. With such information the teacher can design appropriate follow-up activities.

Pairs of children with similar needs may benefit by working with flash cards showing incomplete number sentences on the front and the completed number sentences on the back. By this method one child is tested while the other child acts as the tester, and both benefit from the same experience. Cards showing number sentences for which incorrect answers are given can be set aside for further study and practice.

If the whole class arrives at the measuring activities at the same time, grouping will be necessary, and the actual measuring by the groups might be spread over several days. Each day one

or more groups could carry out the measuring activities while the others move forward with the addition and subtraction facts for sums and minuends of 13 and 14, including review and extra practice.

The teaching suggestions for page 100 indicate the value of the children having opportunities to handle three-dimensional objects on their own before the actual lessons. At the start of this unit a table or a shelf should be set up to display the models. The children should be encouraged to go to the "Shape Centre" in their spare time to build towers, walls, and so on.

## Materials

demonstration thermometer, outdoor thermometers  
containers, cold water, crushed ice  
display board and cutouts, yarn or string  
flash cards for the words *eleven to fourteen*  
fourteen counters for each child  
a number line for each child (optional)  
a paper clip and a strip of paper or cardboard for each child to make a number-line strip  
unmarked metre sticks, trundle wheels (optional)  
objects for markers  
charts for recording estimates and measurements  
ribbon or yarn cut into lengths that measure whole numbers of metres  
real money, play money, or coin cutouts from copies of page T327  
cards showing sets of coins having values to 14¢  
flash cards showing amounts to 14¢  
long envelopes showing a chart  
play store or store chart  
wooden or plastic three-dimensional models  
a board to use as an inclined surface  
chalk or Plasticine  
objects for grouping by tens  
flash cards for addition and subtraction facts having sums to 14  
demonstration number line, work sheets of number lines  
a piece of string one metre long for each child

## Vocabulary

|             |                   |
|-------------|-------------------|
| above zero  | record            |
| below zero  | spend             |
| freeze      | cone              |
| eleven      | cube              |
| twelve      | cylinder          |
| thirteen    | sphere            |
| fourteen    | rectangular prism |
| length      | triangular prism  |
| width       | face              |
| height      | surface           |
| metre stick | roll              |
| metre (m)   | slide             |
| distance    | stack             |



## Unit 5 Theme – Sports and Games

The purpose of this theme is to help develop an appreciation of sports and games as a recreational aspect of life and an awareness of the importance of fitness and good nutrition. It is also hoped that each child will expand her/his knowledge of physical activities, making possible a more productive use of leisure time.

Create a sports and games display as the children complete the activities suggested. Supplement this work with large pictures and appropriate reading material.

### LANGUAGE ACTIVITIES

#### 1. Discussing Sports and Games

Discuss with the children the various aspects of sports and games in daily life. You may wish to ask questions similar to the following:

- “Why do you enjoy sports and games?”
- “What do you learn when playing a game?”
- “Why is it important to participate in sports and games?”
- “What is your favorite sport or game?”

Make a chart with a column labelled “Sports” and a column labelled “Games”. Discuss the difference between a sport and a game. List all the sports and games that the children can suggest. Discuss which column has more entries and whether it was difficult to decide whether an activity was a sport or a game.

#### 2. Sports and Games Calendar

Make a calendar that indicates the seasons and the months we usually associate with each season.

- Summer: June, July, August
- Fall: September, October, November
- Winter: December, January, February
- Spring: March, April, May

Record on this calendar the sports and games that are played during each season. Discuss questions similar to the following:

- “How do the seasons affect our choice of activities?”
- “Which activities extend to more than one season?”
- “Which activities occur all year round?”

#### 3. Classifying Sports and Games

Refer to the list of sports and games resulting from Activity 1. Ask the children to suggest ways of classifying the sports and games. Assign a different method of classification to groups of four or five children. Have the groups share and compare their information. Some of the ways that may be suggested are given below.

- Number of players: team, pairs, individual
- Types of equipment: balls, rackets or sticks, no equipment
- Activity level: active, passive
- Length of playing time: definite time, no time limit

#### 4. Sports Books

Have each child select a favorite sport from the list for Activity 1. Make a list of information that could be shared about that sport:

- a. method of play
- b. skills needed to play
- c. necessary equipment
- d. favorite teams
- e. outstanding players

Have the children collect magazine or newspaper pictures to illustrate the chosen sport. Encourage them to draw pictures to illustrate specific aspects of the sport, such as the equipment needed to play. Have the children record appropriate information about the sport under the headings from the list. Place the completed books in the sports and games display.

### 5. A How-to Book of Sports

The writing of instructions gives the children an opportunity to gain skill in organizing their thoughts. Discuss the various positions that are played in such sports as hockey, baseball, or stickball. Have each child choose a position from a favorite sport and write a set of instructions on playing that position, for example, “How to Be a Goaltender”. Compile the children’s work into “The How-to Book of Sports”.

### MATHEMATICS ACTIVITIES

#### 1. Games Time

Since the theme of this unit involves games, you may wish to organize a “Games Time” for a part of one day in each week that you are teaching this unit. There are various games that involve keeping score or completing addition and subtraction facts. Many of these games can be purchased commercially, but similar games can be prepared in school by using simple materials such as numeral cards or dice.

Children frequently invent their own games or form a new game by changing the rules of an old game. Encourage the children to bring some of their favorite games to school for “Games Time”. Suitable games are Snakes and Ladders, Ring Toss, Checkers, Bingo, Dominoes, Snap, and Fish.

#### 2. Mathscotch

Adapt the game hopscotch to provide a novel way for the children to practise addition facts having sums to 18.

Draw a large hopscotch diagram on the pavement of the schoolyard or on the playground. Print the numerals 1 to 9 at random inside the squares.

Assign a number to each player just before the start of a series of jumps. As the player jumps from square to square he/she must say the sum of the number assigned and the number in the square. When a player gives an incorrect answer, another player takes a turn.

If the children are assigned to teams, points can be won by counting the squares that each player touches before giving an incorrect answer.

This game can be adapted for practising subtraction facts having minuends to 18. In this case, the player subtracts the number in the square from the number assigned, which should be equal to or greater than nine.

#### 3. Fact Finders

Write the name of a sport or game on a slip of paper for each member of your class. Because some sports are more popular than others, you may wish to write the name of one sport, for example, hockey, on several of the slips of paper.

Place the slips in a box or a bag and have each child draw one. Choose a day several days after the drawing when you will ask the children to report one important or interesting numerical fact about the sport or game he/she drew by chance.

#### 4. Graphing

Give each child a slip of paper. Display the list of sports and games from Language Activity 1. Ask the children to print their favorite sport on the slip of paper. Have children collect the slips of paper and help to make a tally chart of the results. The results may also be shown in a graph. You may also wish to determine the children's favorite games in a similar way.

#### 5. Body Parts

Different sports and games require the use of various parts of the body. Discuss the parts that the children use in their sports and games. List each part on a sheet of chart paper. Have the children record the sports and games that require the use of each particular body part. After the charts are completed, ask questions similar to the following:

- “Which body part is used most?”
- “Which body part is used least?”
- “Which sports require the use of more than one body part?”
- “Which activities require the use of all the body parts listed?”

Have the children collect magazine or newspaper pictures illustrating various parts of the body in action during the playing of different sports and games.

### SCIENCE ACTIVITIES

#### 1. Exercising Parts of the Body

Since various parts of the body are used in different physical activities, certain muscles gain strength as they are exercised. Have the children slowly execute the movements involved in such activities as kicking a ball, swinging a tennis racket, swimming, and skating. Have the children concentrate on the movement and locate the muscles being used.

Discuss which activities exercise the whole body. Point out that activities requiring strenuous movement exercise a muscle that we can not see—the heart. Explain that this muscle needs regular exercise just like all the other muscles in the body. Have the children perform several activities that they think will exercise the heart. At the completion of each activity, have the children place their palms on their chests. Ask what the rapid heartbeat indicates. Discuss how long it takes before the heartbeat is barely noticeable. Have the children suggest activities that exercise all parts of the body, including the heart.

#### 2. Eating for Health and Energy

A strong and healthy body is necessary for top performance in any sport or game. Exercise must be supported by good nutrition to assure sound health.

Ask the children to define energy and to explain why it is necessary for the enjoyment of sports and games. Explain that strong and healthy muscles are necessary to sustain energy. No one food will magically maintain muscles and provide energy. A strong and healthy body depends on a balanced diet. Discuss the elements of a nutritious and balanced diet. Have children find pictures of appropriate foods and illustrate meals for providing a proper diet.

#### 3. Sports Safety

Professional athletes who make their living at team sports must be careful to protect themselves from injury. Discuss the safety equipment used in professional sports. For example, football players and hockey players wear padded guards on various parts of the body as well as helmets with mouth guards; baseball

players wear special helmets when at bat and the catcher wears a face guard. The children should see that there is a relationship between body contact and physical protection.

People who play sports for recreation and enjoyment must also protect themselves from injury. If possible, display a safety-approved sports helmet with a mouth guard. Encourage the children to try on the helmet to experience its protective nature. Explain and discuss the important role of the mouth guard.

Besides personal protective equipment there are rules of behavior to make sports and games safer for both the participants and the spectators. Encourage the children to suggest rules such as the following:

- a. Never push or shove while waiting a turn.
- b. Keep glass containers away from playing areas.
- c. Wear proper shoes.
- d. Stop and rest when you become tired.
- e. Do not chew gum or eat food while playing.
- f. Be alert at all times to avoid injury.

### SOCIAL STUDIES ACTIVITIES

#### 1. Games Around the World

By now the children will begin to understand that sports and games are an integral part of a culture. Some of the games we play originated in Canada, but many are adaptations of games from other countries. Some games are relatively new, whereas some are hundreds of years old.

Lacrosse originated among the North American Indians. In fact, in 1867 it was adopted as the Canadian national game. If possible, display a lacrosse stick and ball. Tell how the Indians played the game, sometimes with hundreds of players on a team. The ball is passed from stick to stick and players must not touch it with their hands or their bodies. The players attempt to direct the ball into the opponent's net to score as in hockey. For playing mock lacrosse, make a scoop for each player by cutting off the top part of a plastic bleach bottle just below the handle. A tennis ball may be tossed from scoop to scoop.

If you are fortunate enough to have children from various cultural backgrounds, have them describe their native games.

#### 2. The Origin of Sports and Games

Arouse the children's interest in the origin of sports and games by telling how several of them originated.

Many sports developed from the skills that our ancestors acquired in an attempt to stay alive. In the beginning, people learned to run to escape not only from flesh-eating animals but also from such natural disasters as earthquakes, floods, and erupting volcanoes. Later they developed skills in hunting and in defending themselves from attack. These skills included the throwing of rocks, lashing out with sticks, and kicking. Still later, people created weapons such as the bow and arrow and the slingshot, and crude craft for crossing rivers and lakes.

Through time, people began to use their acquired skills and implements to occupy idle hours. When people collected in a group, it was natural for competitions involving certain skills to take place. Thus games and pastimes developed.

The origins of golf and basketball may be of interest to the children.

Golf, according to legend, may have originated in Scotland. It is believed that a shepherd, becoming bored with the monotony of his task, began to pass the time by hitting round stones along



the ground with his crook. One of the rolling stones happened to fall into a rabbit hole. From this humble beginning, golf became so popular in Scotland that it was banned for a time because people spent so much time playing golf that they neglected their work.

Unlike golf, basketball was not the result of a lucky chance; basketball was invented. It was invented by a Canadian because of the need for a game that could be played indoors and be less demanding physically and have less body contact than football or rugby. A game was also needed that could be played in the months between the baseball season and the football season.

To eliminate body contact the inventor of basketball decided to place the goal above the heads of the players. So he fastened an old straw peach basket at one end of a school gym. A soccer ball was used as the first basketball. From this beginning, basketball has become one of the most popular spectator sports.

If these two stories arouse the children's curiosity, assign the name of a sport or game to a group of four or five children. Have them try to find out and report to the class about the origin of the particular sport or game assigned to them.

### 3. Dress for Sports and Games

Have prepared a list of sports and games that includes all those suggested by the children for Language Activity 1 as well as others that the children may not have mentioned.

Assign a sport or a game to each child. Tell the children that they are to find out whether a special uniform or outfit is required to play the sport or game. If so, they are to describe the outfit to the class and, if possible, display a picture of a player or players wearing the outfit.

## ART ACTIVITIES

### 1. Patterns of Sports Symbols

Have each child select a piece of sports equipment such as a hockey stick or a puck. Have the children make stamps of the object from Plasticine or modelling clay. They can then place the stamps in thick tempera paint and print them on paper to make patterns and designs.

### 2. Sports Broadcast

Provide the children with part of a roll of white shelf paper. Have them illustrate a sports event (hockey game, horse race, skating competition) vertically on the paper. Make a "television set" out of a box. Use large dowels cut to size for rollers. Support the rollers on hooks attached to the front of the box so that the paper can be wound from the top roller to the bottom roller. "Sports commentators" should describe what is "happening" as other children turn the rollers to reveal the "action".

## MOVEMENT ACTIVITIES

### 1. Invent a Game

Divide the children into groups of six in the gym. Provide each group with such items as tin cans, ping-pong balls, clothes pins, covers from jars, handkerchiefs, fruit baskets. Challenge each group to invent a game using their particular item or items.

### 2. The Motions of Sport

Discuss the types of body movements required by various sports and games. The children may suggest jumping, running, hopping, skipping, skating, and skiing. Practise these movements in a warm-up by calling the movements at random as the

children move around the gym. As each new method of movement is called, the children must respond by moving in that style. When the children are very familiar with the movements, play relay games based on combinations of the movements, using small equipment such as bean bags, balls, or hoops.

## MUSIC ACTIVITIES

### 1. Singing Games

Many popular children's games are based on songs or singing rhymes. Discuss with the children the singing games that they know. Encourage them to share games that other children may not know. Record the games in a book and include the words of the songs or rhymes. Spend a few minutes each day selecting a singing game from the book and playing it in the classroom. You may wish to start with the two old favorites "London Bridge Is Falling Down" and "The Farmer in the Dell".

### 2. Musical Games

The following games are played to the accompaniment of music. They are variations of the game "Musical Chairs".

#### *Musical Numbers*

Any number of players move about the gym while music is played in the background. When the music stops, the leader calls out a number less than ten: "Two", "Three", "Four", or whatever number appeals. The players rush to form groups having the number called. The player or players who cannot become part of a group withdraw from the game and may choose the number for the next round.

#### *Musical Surprise*

Place an item such as an apple, a candy, or a packet of balloons in a small box and wrap it in brightly colored paper. Have the players form a large circle and pass the surprise package from right to left while music is played in the background. The player holding the parcel at the precise moment when the music stops withdraws from the game. The one player left in the ring after all the others have been eliminated receives the surprise package as a prize.

#### *Musical Islands*

Place carpet tiles, sheets of paper, or covers from shoe boxes randomly on the floor of the gym. Any number of players march in a circle while music is being played. When the music stops, players must rush to the nearest "island". Any player who is unable to place both her/his feet on an "island" must withdraw from the game, taking an "island" with them. The last player left in the circle is declared "Sole Survivor". Choose the number of "islands" carefully, according to the number of players so that not too many players have to withdraw too soon. On the other hand, you do not want all the players to be "rescued" each time.

### 3. Sounds of Sports and Games

Many sports and games have characteristic sounds, such as the crack of a bat hitting a ball or the grating of skates cutting into ice. Some sounds are universal to many sports and games, such as the cheering and excitement of spectators. Use a tape recorder to record the sounds of various sports and games around the school. Encourage the children to make observations and comparisons of the sounds. Have children prepare illustrations of each event represented by the sounds. Assemble the pictures to make a book. Play the tape and have the children associate each sound with its illustration.

## Unit 5

What temperature is shown?

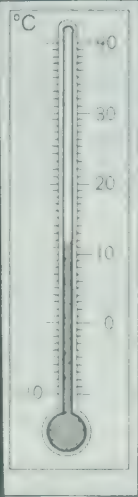
↑  
above  
zero

→  
zero

↓  
below  
zero



10°C below zero



12°C above zero

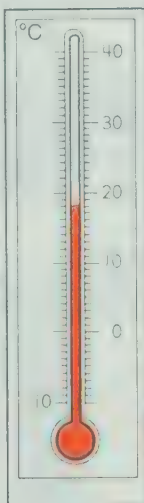


4°C below zero

Show the temperature.



6°C below zero



18°C above zero

Show the temperature.



Answer will vary.

Reading and showing temperatures above and below zero

(eighty-five) 85

## LESSON OUTCOME

Read and show temperatures above and below zero

## Materials

demonstration thermometer, outdoor thermometers, a container of very cold water, a container of crushed ice, freezer unit of a refrigerator (optional), red crayon for each child

## Vocabulary

above zero, below zero, freeze

## RELATED ACTIVITIES

- Continue to have children give daily weather reports. They may obtain the information from the daily newspaper and also read the outdoor thermometer. Both individual and class records of temperatures and weather should be kept for at least one or two weeks.

## LESSON ACTIVITY

## Before Using the Page

- Print the words *above*, *below*, *zero*, and *temperature* on the chalkboard. Review these and the symbol ° for “degrees” and the letter C for “Celsius”.

Show several above zero temperatures on the demonstration thermometer and have children read them, for example, 15°C is read “fifteen degrees Celsius”. State different above zero temperatures and have children show them on the thermometer.

Have a child move the red line of the demonstration thermometer to show zero degrees. Ask the children what would happen to water in a pan left outside if the temperature was 0°C. Discuss the fact that water freezes at 0°C.

Place an outdoor thermometer in a glass of very cold water. Have a child read the temperature. Record the temperature on the chalkboard. Then place the thermometer in a container filled with crushed ice. Have a child read the temperature. Record it on the chalkboard. Discuss the results.

Have several children show some below zero temperatures on the demonstration thermometer.

- If the school has a refrigerator with a freezer section, place an outdoor thermometer in the freezer section for about a minute. Then have children observe quickly the number of degrees shown.

- Discuss the kinds of things that can be done if the temperature is below zero. Ask questions similar to these:

“What can you do outdoors when the temperature goes below 0°C?”

“What kind of food could we not keep if the refrigerator had no section for below zero temperatures?”

## Using the Page

- Read the instructions to the children and discuss what the arrows indicate. Have the children locate the mark for zero degrees on the first thermometer. Ask whether the temperature shown is above zero or below zero. Have the children record the temperature shown on the first three thermometers. On the next two thermometers, have the children draw red marks to show each temperature given. For the last thermometer, you may wish to have some of the children go outside to determine the temperature and report it to the rest of the class.



## LESSON OUTCOME

Complete addition facts for sums of 11

## Materials

display board and cutouts, flash card for the word *eleven*, eleven counters and a sheet of paper for each child

## Vocabulary

eleven

## RELATED ACTIVITIES

- Have the children write the basic addition facts having sums of 11 on the chalkboard, in the order shown. Have them draw lines to match sentences that have the same addends but in the opposite order (to illustrate the commutative property of addition).

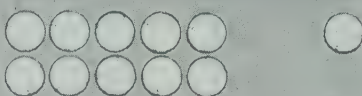
$$9 + 2 = 11$$

$$8 + 3 = 11$$


$$2 + 9 = 11$$

- Give each child a block of four rows of squares with 11 squares in each row. Have them paste it onto a large sheet of plain paper and use two colors to illustrate the basic addition facts having sums of 11 ( $2 + 9$ ,  $3 + 8$ ,  $4 + 7$ ,  $5 + 6$ ). Have them write the phrases along one side, turn the chart around, and write four more phrases along the opposite side ( $9 + 2$ ,  $8 + 3$ ,  $7 + 4$ ,  $6 + 5$ ).
- Have the children practise basic addition facts having sums of 11 as described on page T133.


Complete the number sentences.




$$\underline{9} + \underline{2} = \underline{11}$$




$$\underline{8} + \underline{3} = \underline{11}$$




$$\underline{7} + \underline{4} = \underline{11}$$



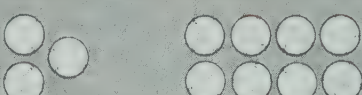
$$\underline{6} + \underline{5} = \underline{11}$$



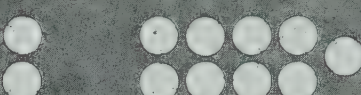
$$\underline{5} + \underline{6} = \underline{11}$$



$$\underline{4} + \underline{7} = \underline{11}$$



$$\underline{3} + \underline{8} = \underline{11}$$



$$\underline{2} + \underline{9} = \underline{11}$$

10 + 1 eleven.  
11

Complete.

$9 + \underline{2} = 11$   
 $4 + \underline{7} = 11$   
 $8 + \underline{3} = 11$

$3 + \underline{8} = 11$   
 $5 + \underline{6} = 11$   
 $7 + \underline{4} = 11$

$\underline{5} + 6 = 11$   
 $\underline{9} + 2 = 11$   
 $\underline{7} + 4 = 11$

86 (eighty-six)

Addition facts, sums of 11

## LESSON ACTIVITY

### Before Using the Page

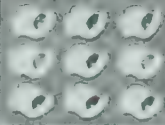
- Ask one child to place ten cutouts on the display board. Ask the children how many cutouts there would be if one more were placed on the display board. Have one child place one more cutout on the display board. Review the word *eleven* and the numeral 11. Ask several children to print the numeral on the chalkboard. Use a flash card for the word *eleven* throughout the day to reinforce recognition of the word.
- Ask one child to partition the set of eleven cutouts on the display board to show a group of ten and one more. Ask how many tens there are and how many single ones there are. Have the children say, "Eleven is ten and one more." Ask another child to partition the set in a different way. Repeat several times.
- Give each child eleven counters and a sheet of paper. Have the children partition the set of counters in as many different ways as possible. For each way they partition the set, have them write the appropriate addition sentence on their papers. When the children have finished, discuss their results. Have children

write the addition sentences on the chalkboard to show the ways in which the set of eleven counters was partitioned.

### Using the Page

- Ask how many baseballs are shown at the top of the page. Have children read the addition phrase and the word. Read the instruction to the children. Ask how many balls there are in the first group and how many there are in the second group. Have the children trace over the dotted 9 and the dotted 2. Ask how many balls there are altogether. Have the children complete the number sentence. Then let the children complete the page independently. After they have finished their work, ask them to ring ten baseballs in each of the first eight exercises, to reinforce that 11 is 10 and 1 more.

Complete the number sentences.



$$11 - 2 = 9$$

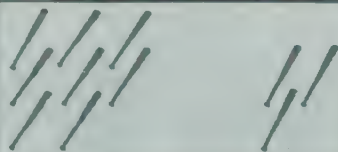
$$11 - 9 = 2$$

$$11 - 2 = 9$$

$$9 + 2 = 11$$

$$11 - 9 = 2$$

$$2 + 9 = 11$$



$$11 - 3 = 8$$

$$11 - 8 = 3$$

$$11 - 3 = 8$$

$$8 + 3 = 11$$

$$11 - 8 = 3$$

$$3 + 8 = 11$$



$$11 - 4 = 7$$

$$11 - 7 = 4$$

$$11 - 4 = 7$$

$$7 + 4 = 11$$

$$11 - 7 = 4$$

$$4 + 7 = 11$$



$$11 - 5 = 6$$

$$11 - 6 = 5$$

$$11 - 5 = 6$$

$$6 + 5 = 11$$

$$11 - 6 = 5$$

$$5 + 6 = 11$$

Add or subtract.

$$\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 9 \\ + 2 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 11 \\ - 2 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 4 \\ + 7 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 11 \\ - 7 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 2 \\ + 9 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 3 \\ + 8 \\ \hline 11 \end{array}$$

Relating addition and subtraction facts, sums of 11

(eighty-seven) 87

## LESSON OUTCOME

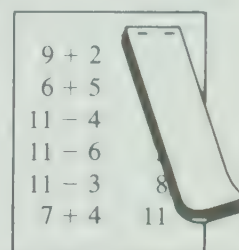
Complete related basic addition and subtraction facts, sums of 11

## Materials

display board and cutouts, eleven counters for each child, yarn or string

## RELATED ACTIVITIES

- Make cards showing addition and subtraction phrases (sums and minuends to 11) at the left and the answers at the right. Staple many strips of paper over the answers. Have the children write the sums or differences on the top strip and then pull it off, look underneath the remaining strips, and check their answers.



- Give each child a work sheet similar to the one shown or use the chalkboard. Have the children complete the number sentences, using counters if necessary.

|                   |
|-------------------|
| 7 + _____ = _____ |
| 4 + _____ = _____ |
| 11 - _____ = 4    |
| _____ - _____ = 7 |

## LESSON ACTIVITY

## Before Using the Page

- Ask a child to place eleven cutouts on the display board. Remove one and ask how many are left. Say, "Eleven minus one equals ten."

Start with eleven cutouts again and remove two. Ask how many are left and have the children say, "Eleven minus two equals nine." Repeat the procedure for removing three cutouts.

Write the subtraction sentence  $11 - 7 = \underline{\quad}$  on the chalkboard. Ask how the cutouts can be used to obtain the answer. Have a child illustrate the procedure and complete the subtraction sentence.

- Write the sentences for the basic subtraction facts having minuends of 11 on the chalkboard. Have the children complete the sentences with the help of their counters. You may wish to have them copy the sentences.

$$11 - 2 = \underline{\quad}$$

$$11 - 9 = \underline{\quad}$$

$$11 - 3 = \underline{\quad}$$

$$11 - 8 = \underline{\quad}$$

$$11 - 4 = \underline{\quad}$$

$$11 - 7 = \underline{\quad}$$

$$11 - 5 = \underline{\quad}$$

$$11 - 6 = \underline{\quad}$$

- Ask a child to place eleven cutouts inside a loop of yarn or string on the display board. Have another child partition the set to show 9 and 2. Lead the children to suggest two addition sentences as a result of the partitioning ( $9 + 2 = 11$  and  $2 + 9 = 11$ ). Write the sentences on the chalkboard. Cover the two cutouts first and then the nine cutouts. Each time, ask how many are left and write the subtraction sentence.

- Ask the children to separate their eleven counters into groups of eight and three. Have them suggest two addition and two subtraction sentences. Write the four sentences on the chalkboard.

## Using the Page

- Read the instruction and have the children interpret the first illustration. Discuss the first subtraction sentence. Ask what number completes the second subtraction sentence. Then have the children complete the four related number sentences.

Have the children complete the left part of the page first. Then they may complete the addition and subtraction facts at the right. Caution the children to pay attention to the symbol + or - before writing each answer. The children may use their counters, if necessary.



## LESSON OUTCOME

Complete addition facts for sums of 12

### Materials

display board and cutouts, flash card for the word *twelve*, twelve counters and a sheet of paper for each child

### Vocabulary

twelve

## RELATED ACTIVITIES

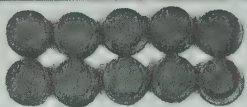
- Have the children write the basic addition facts having sums of 12 on the chalkboard, in the order shown. Have them draw lines to match sentences that have the same addends but in the opposite order (to illustrate the commutative property of addition).

$$\begin{array}{r} 9 + 3 = 12 \\ 8 + 4 = 12 \end{array}$$

$$3 + 9 = 12$$

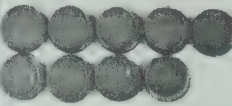
- Prepare a work sheet showing a tree and leaves on which there are addition phrases. Some are names for the number 12. Have the children cut out the leaves that show combinations for 12 and paste the leaves on the tree. You may wish to have the children color the tree and the leaves afterward.


- Have the children color squares to illustrate the basic addition facts having sums of 12 as suggested in *Related Activities* on page T114.

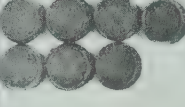


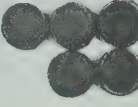
$10 + 2$   
12 twelve

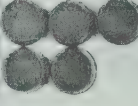
Show how many. Ring ten and complete.

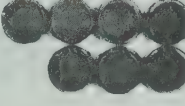

 $9 + 3 = 12$



 $8 + 4 = 12$


 $7 + 5 = 12$


 $6 + 6 = 12$


 $5 + 7 = 12$


 $4 + 8 = 12$


 $3 + 9 = 12$

Complete.

|     |   |      |
|-----|---|------|
| 9 + | 3 | = 12 |
| 4 + | 8 | = 12 |
| 6 + | 6 | = 12 |
| 8 + | 4 | = 12 |

|     |   |      |
|-----|---|------|
| 7 + | 5 | = 12 |
| 9 + | 3 | = 12 |
| 5 + | 7 | = 12 |
| 6 + | 6 | = 12 |

Addition facts, sums of 12

88 (eighty-eight)

## LESSON ACTIVITY

### Before Using the Page

- Ask a child to place eleven cutouts on the display board. Place one cutout on the display board and ask how many cutouts there are now. Review the word *twelve* and the numeral 12. Ask several children to print the numeral on the chalkboard. Use a flash card for the word *twelve* throughout the day to reinforce recognition of the word.
- Ask one child to partition the set of twelve cutouts on the display board to show a group of ten and two more. Ask how many tens there are and how many single ones there are. Have the children say, "Twelve is one ten and two more." Ask another child to partition the set of twelve counters to show 9 and 3. Write the addition sentence ( $9 + 3 = 12$ ) on the chalkboard.
- Give each child twelve counters and a sheet of paper. Have the children partition the twelve counters into two groups. For each way they partition the set of counters, have them write the appropriate addition sentence on their papers. When the children have finished, discuss their results. Have children write the addi-

tion sentences on the chalkboard to show the ways in which the set of twelve counters was partitioned.

### Using the Page

- Ask how many red checkers and how many black checkers are shown at the top of the page. Have children read the addition phrase and the word. Read the instruction to the children. Ask how many checkers there are in the first group and how many there are in the second group. Have the children trace over the dotted 9 and the dotted 3. Ask how many checkers there are altogether. Have the children complete the number sentence. Then let the children complete the page independently.

After the children have completed the page, you may wish to demonstrate how the children could find the sum of 9 and 3, 8 and 4, 7 and 5, 6 and 6, 5 and 7, 4 and 8, and 3 and 9, by first ringing the ten red checkers and then finding the sum of 10 and 2 each time.

## LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 12

## Materials

display board and cutouts, twelve counters for each child, yarn or string

## RELATED ACTIVITIES

- Use copies of page T332 and prepare a number wheel for each child as shown. Have the children write the missing numbers, using the sum (minuend) of 12 each time.



- Give each child a work sheet similar to the one shown or use the chalkboard. Have the children complete the number sentences, using counters if necessary.

|  |   |
|--|---|
|  | $7 + \underline{\quad} = \underline{\quad}$ |
|  | $\underline{\quad} + 7 = \underline{\quad}$ |
|  | $12 - \underline{\quad} = 7$                |
|  | $\underline{\quad} - 7 = \underline{\quad}$ |

Complete the number sentences.

|                                      |                          |
|--------------------------------------|--------------------------|
|                                      | $12 - 3 = \underline{9}$ |
|                                      | $\underline{9} + 3 = 12$ |
| $12 - \underline{3} = \underline{9}$ | $12 - 9 = \underline{3}$ |
| $12 - \underline{9} = \underline{3}$ | $\underline{3} + 9 = 12$ |

|                                      |                          |
|--------------------------------------|--------------------------|
|                                      | $12 - 4 = \underline{8}$ |
|                                      | $\underline{8} + 4 = 12$ |
| $12 - \underline{4} = \underline{8}$ | $12 - 8 = \underline{4}$ |
| $12 - \underline{8} = \underline{4}$ | $\underline{4} + 8 = 12$ |

|                                      |                                      |
|--------------------------------------|--------------------------------------|
|                                      | $12 - 7 = \underline{5}$             |
|                                      | $\underline{5} + 7 = 12$             |
| $12 - \underline{5} = \underline{7}$ | $12 - \underline{7} = \underline{5}$ |
| $12 - \underline{7} = \underline{5}$ | $\underline{7} + \underline{5} = 12$ |

|                                      |                                      |
|--------------------------------------|--------------------------------------|
|                                      | $12 - 6 = \underline{6}$             |
|                                      | $\underline{6} + \underline{6} = 12$ |
| $12 - \underline{6} = \underline{6}$ |                                      |

Add or subtract.

|  |  |
|--|--|
| $\begin{array}{r} 8 \\ + 4 \\ \hline 12 \end{array}$ | $\begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array}$ |
|--|--|

|  |  |
|--|--|
| $\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array}$ | $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$ |
|--|--|

|  |  |
|--|--|
| $\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$ | $\begin{array}{r} 3 \\ + 9 \\ \hline 12 \end{array}$ |
|--|--|

|  |  |
|--|--|
| $\begin{array}{r} 12 \\ - 9 \\ \hline 3 \end{array}$ | $\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$ |
|--|--|

|  |  |
|--|--|
| $\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$ | $\begin{array}{r} 4 \\ + 8 \\ \hline 12 \end{array}$ |
|--|--|

|  |  |
|--|--|
| $\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$ | $\begin{array}{r} 7 \\ + 5 \\ \hline 12 \end{array}$ |
|--|--|

Relating addition and subtraction facts, sums of 12

(eighty-nine) 89

## LESSON ACTIVITY

## Before Using the Page

- Ask a child to place twelve cutouts on the display board. Remove one and ask how many are left. Say, "Twelve minus one equals eleven."

Start with twelve cutouts again and progress through  $12 - 2$  and  $12 - 3$  in the same way, but have the children say the subtraction sentence.

Write the subtraction sentence  $12 - 7 = \underline{\quad}$  on the chalkboard. Ask how the cutouts can be used to obtain the answer. Have a child illustrate the procedure and complete the subtraction sentence.

- Write the sentences for the basic subtraction facts having minuends of 12 on the chalkboard. Have the children complete the sentences with the help of their counters. You may wish to have them copy the sentences.

|                              |                              |
|------------------------------|------------------------------|
| $12 - 3 = \underline{\quad}$ | $12 - 9 = \underline{\quad}$ |
| $12 - 4 = \underline{\quad}$ | $12 - 8 = \underline{\quad}$ |
| $12 - 5 = \underline{\quad}$ | $12 - 7 = \underline{\quad}$ |
| $12 - 6 = \underline{\quad}$ |                              |

- Ask a child to place twelve cutouts inside a loop of yarn or string on the display board. Have another child partition the set to show 9 and 3. Lead the children to suggest two addition sentences as a result of the partitioning ( $9 + 3 = 12$  and  $3 + 9 = 12$ ). Write the sentences on the chalkboard. Cover the three cutouts and ask how many are left. Then cover the nine cutouts and ask how many are left. Each time write the corresponding subtraction sentence.

- Ask the children to separate their twelve counters into groups of eight and four. Have them suggest two addition and two subtraction sentences. Write the sentences on the chalkboard.

## Using the Page

- Read the instruction and have the children interpret the first illustration. Discuss the first subtraction sentence. Ask what number completes the second subtraction sentence. Then have the children complete the four related number sentences.

Have the children complete the left part of the page first. Then they may complete the addition and subtraction facts at the right. Caution the children to pay attention to the symbol  $+$  or  $-$  before writing each answer.



## LESSON OUTCOME

Complete basic addition and subtraction facts, sums and minuends of 10, 11, and 12

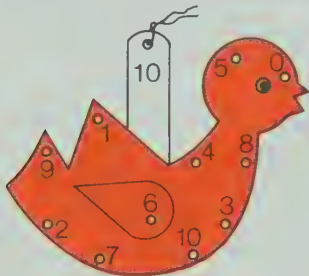
### Materials

display board and cutouts, twelve counters for each child, number line for each child (optional)

## RELATED ACTIVITIES

- Use construction paper for making cutouts of the shape shown. Write numerals around the edge and punch a hole beside each numeral. Glue a popsicle stick to the back of each shape and write a numeral on it to serve as a minuend. Write the answers beside the corresponding holes on the back of the shape.

Have the children use this device in the following manner: For  $10 - 6$ , for example, a child will push a pipe cleaner through the hole beside the numeral 6. The child determines the answer and then looks on the back of the shape to check her/his answer.



Similar shapes can be made for minuends of 11 and 12.

## LESSON ACTIVITY

### Before Using the Page

- Use cutouts on the display board to review addition and subtraction facts having sums of 10, 11, and 12. Emphasize the joining action for the operation of addition and the separating action for the operation of subtraction.
- Write several incomplete addition and subtraction sentences on the chalkboard. Have the children use their counters to illustrate each sentence. For example, for  $6 + 5 = \underline{\quad}$ , the children will form a group of six counters and a group of five counters, and then join the two groups together to determine that there are eleven counters. Have the children complete the addition sentences.
- Repeat the preceding activity for exercises written in vertical form.

### Using the Page

- Allow the children to work independently, using their counters or a number line if necessary, to obtain the answers. After

Add or subtract.

|  |  |  |  |  |
|--|--|--|--|--|
| $\begin{array}{r} 8 \\ + 4 \\ \hline 12 \end{array}$ | $\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array}$ | $\begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$ | $\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$ |  |
| $10 - 3 = \underline{7}$                             |  | $12 - 4 = \underline{8}$                             | $5 + 6 = \underline{11}$                             |  |
| $\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array}$ | $\begin{array}{r} 3 \\ + 8 \\ \hline 11 \end{array}$ | $\begin{array}{r} 10 \\ - 1 \\ \hline 9 \end{array}$ | $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$ |  |
| $8 + 2 = \underline{10}$                             |  | $12 - 5 = \underline{7}$                             | $11 - 7 = \underline{4}$                             |  |
| $\begin{array}{r} 12 \\ - 8 \\ \hline 4 \end{array}$ | $\begin{array}{r} 9 \\ + 2 \\ \hline 11 \end{array}$ | $\begin{array}{r} 3 \\ + 7 \\ \hline 10 \end{array}$ | $\begin{array}{r} 9 \\ + 3 \\ \hline 12 \end{array}$ |  |
| $5 + 5 = \underline{10}$                             |  | $3 + 9 = \underline{12}$                             | $11 - 3 = \underline{8}$                             |  |
| $\begin{array}{r} 12 \\ - 9 \\ \hline 3 \end{array}$ | $\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$ | $\begin{array}{r} 10 \\ - 2 \\ \hline 8 \end{array}$ | $\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$ |  |

90 (ninety)






Addition and subtraction practice: sums and minuends of 10, 11, and 12

you check their answers, you may wish to have them color inside the shapes according to the following code:

- If you added and the sum was 12, color the shape blue.
- If you subtracted from 12, color the shape blue.
- If you added and the sum was 11, color the shape red.
- If you subtracted from 11, color the shape red.
- If you added and the sum was 10, color the shape green.
- If you subtracted from 10, color the shape green.

If the children follow the instructions carefully, a definite colored design will result.

Check to show what you could use to measure each object.

|   |  |  |  |  |  |
|---|---|---|---|---|---|
|  |   |   | ✓   | ✓   |   |
|  | ✓   | ✓   |   |   |   |
|  | ✓   | ✓   | ✓   |   |   |
|  |   |   | ✓   | ✓   | ✓   |
|  |   |   | ✓   | ✓   | ✓   |

A number-line strip can make it easier to measure in paper clips. Mark spaces for 10 paper clips on a strip of paper. Use your paper strip for measuring.

Answer will vary.

Length of chalkboard      1      2      3      4  
about \_\_\_\_\_ strips

Height of door      about \_\_\_\_\_ strips

Width of classroom      about \_\_\_\_\_ strips

Height of a friend      about \_\_\_\_\_ strips

Recognizing suitable non-standard units of length

(ninety-one) 91

## LESSON OUTCOME

Recognize suitable non-standard units of length; measure length using a ruler marked in non-standard units

### Materials

a paper clip and a strip of paper or cardboard for each child, scissors

### Vocabulary

length, width, height

## RELATED ACTIVITIES

- You may wish to have the children translate the number of strips for the answers to the last four exercises on the page to one of the other forms suggested for the activities in *Before Using the Page*; that is, if an answer is "about 5 strips" it may be given more exactly as "5 strips and 3 more clips".
- Have the children use their number-line strips to measure other objects inside and outside the classroom and record the measurements.

## LESSON ACTIVITY

### Before Using the Page

- Review the non-standard units of length that were used in Unit 1: the finger, the hand, the span, the pace, a paper clip. Have the children suggest other objects that could be used to measure length.
- Discuss the suitability of different units for measuring certain lengths. For example, would a nail be suitable for measuring the length of the classroom? Why not? What would be a more suitable unit? Suggest an object the length of which it would be practical to measure using a nail. Lead the children to see that a specific unit of measurement is used if it is practical for the length of the object being measured.
- The children will be working with the metre stick on page 92. The following activity will help to prepare them for this longer unit of measurement, which will eventually be divided into smaller units.

Show the children how one paper clip and a strip of paper can be used to make a number-line strip. When the units are marked and numbered, the strip can be used more conveniently for

measuring than a single paper clip. Give each child a strip of paper or cardboard and a paper clip. Have the children place the clip along the edge of the strip and mark the end of the paper clip each time. Have them make the strip 10 paper clips long.

Have the children use the strips to measure an object in the classroom. They may describe the measurement by saying, "The length of the desk is about 2 strips." Other descriptions are also possible; for example, the length may be described as "2 strips and 3 more clips" or "2 tens and 3 more" or "23 clips".

### Using the Page

- Have the children identify the units of measurement that are shown at the top of the page (paper clip, nail, span, straw, pace). Then have them identify the objects at the left (table, pencil, book, door, chalkboard). Ask the children to think about the table and consider which of the units shown would be suitable for measuring the length of the table. Have them mark a check to show each unit that they think would be suitable. Then have them consider each of the other objects in the same way.

For the four measurements at the bottom of the page, have the children use the number-line strips that they made.



LESSON OUTCOME

Measure length in metres

Materials

number-line strips, unmarked metre sticks

Vocabulary

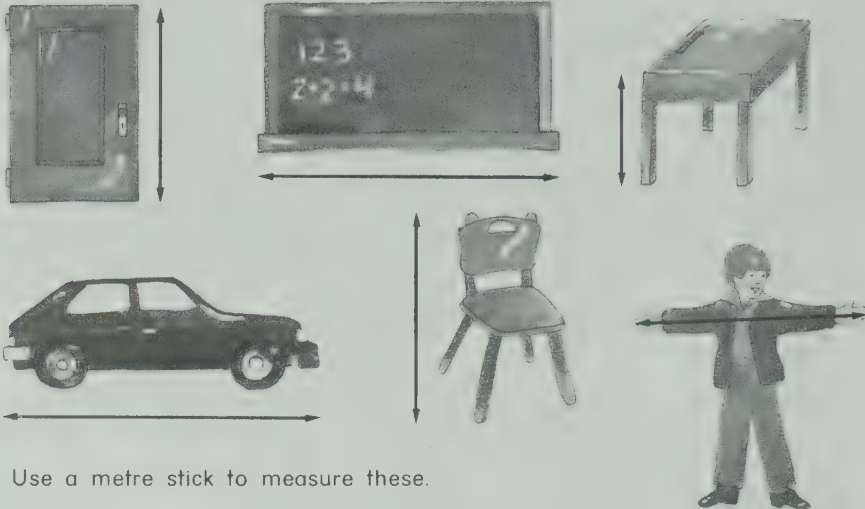
metre stick, metre (m)

RELATED ACTIVITIES

- Give the children many opportunities to measure lengths with a metre stick. A piece of string one metre long can be taken home and used to measure objects with the help of family members. The results can be recorded in pictures or in words; for example, "My bed is about 2 m long," and "Our driveway is about 4 m wide."

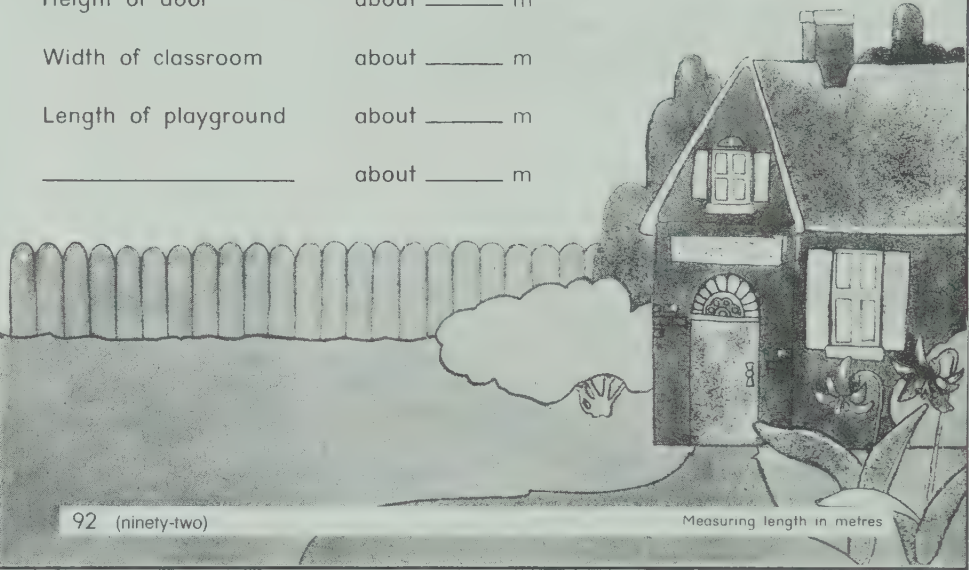
Answer will vary.

Ring the objects that measure more than a metre.  
Check the objects that measure less than a metre.



Use a metre stick to measure these.

|                      |               |
|----------------------|---------------|
| Length of chalkboard | about _____ m |
| Height of door       | about _____ m |
| Width of classroom   | about _____ m |
| Length of playground | about _____ m |
| _____                | about _____ m |



92 (ninety-two)

Measuring length in metres

LESSON ACTIVITY

Before Using the Page

- Have children measure several objects using the number-line strips prepared for page 91. Lead the children to realize that the number-line strips are not very durable measuring devices. Tell them about the special "measuring strip" called the *metre stick* and why it is used all over the world. Display an unmarked metre stick and say that they will be using it to measure lengths.
- Place a metre stick upright on the floor and have a child stand beside it. Ask children to state whether the child is shorter than, taller than, or the same height as the metre stick. Repeat the procedure for other children.
- Have the children spread their arms apart at shoulder level. Hold the metre stick to see whether the arm span is longer than a metre, shorter than a metre, or of the same length as a metre. In most cases, if not all, the arm span will be longer than one metre. Have the children bring their arms closer together so that the tips of their fingers are one metre apart. Remove the metre stick and have the children practise estimating when their hands are one metre apart.

- Have the children find objects that are longer than one metre, objects that are shorter than one metre, and objects that are about one metre long. Record these on a chart and introduce the symbol "m" as a short way of writing the word *metre*. Emphasize that the symbol "m" should always be read as "metre" or "metres".
- Have children use the metre stick to measure various objects in the classroom. Since few objects are a whole number of metres in length, you will need to discuss the idea of rounding to the nearest whole number of metres. For example, if a length is closer to three metres than it is to four metres, we say that the length is "about three metres".

Using the Page

- For the first part of the page, have the children use a metre stick to determine whether the lengths of the real objects suggested by the pictures are longer than or shorter than one metre. For the second part of the page, have the children measure the four lengths suggested and choose a fifth length on their own. You may wish to replace some of the suggestions with others that are more appropriate for your particular class.

Use two markers to show your estimate for each distance.  
Measure to check your estimate. *Answer will vary.*

| Distance | too short | My estimate was<br>about right | too long |
|----------|-----------|--------------------------------|----------|
| 2 m      |           |                                |          |
| 4 m      |           |                                |          |
| 6 m      |           |                                |          |
| 10 m     |           |                                |          |
| 5 m      |           |                                |          |

Estimate first. Then use a metre stick,  
a metre tape, or a trundle wheel to measure.

|  | Estimate      | Measurement   |
|--|---------------|---------------|
| Length of classroom  | about _____ m | about _____ m |
| Width of playground  | about _____ m | about _____ m |
| Length of school   | about _____ m | about _____ m |
| Distance a friend<br>can walk while I<br>count from one to ten | about _____ m | about _____ m |



## LESSON OUTCOME

Estimate length in metres; measure to check an estimate of length

### Materials

trundle wheels (optional), unmarked metre sticks, objects for markers, charts for recording estimates and measurements, ribbon or yarn cut into lengths that measure whole numbers of metres

### Vocabulary

distance

## RELATED ACTIVITIES

- Have the children look for objects that are about a metre long or a metre wide. Have the children record them by name or draw pictures of them.
- Help the children to measure a distance of 100 m outside the school. Have them mark intermediate distances of 50 m and 25 m. You may wish to have some children run a certain number of metres while other children time them, using non-standard units of time.
- The children may be interested in measuring the distance between certain landmarks close to the school, so that these can be used for reference when estimating other distances; for example, the distance between two trees, or the distance from the school to a particular tree.

## LESSON ACTIVITY

### Before Using the Page

- After the children have had many opportunities for measuring with a metre stick, they will be ready for experiences involving estimating lengths. An estimate of each length should be followed by a measurement of that length and the two numbers should be compared.
- If you have trundle wheels, have the children use these in the gym. Otherwise, have the children use metre sticks and two pencils, blocks, or other objects as markers. Have them measure the length and the width of the gym. If there are colored lines marked on the floor of the gym, have the children also measure the lengths of these lines.
- Have the children estimate distances that measure a whole number of metres. For example, ask them to estimate a distance of two metres. They may use their markers to indicate the limits of their estimates. Then have them measure the distance and indicate whether the estimate was too short, about right, or too long. They may record their results on a chart similar to the one shown on the page.

- Cut ribbons and yarns of different colors into lengths that measure whole numbers of metres. Have the children estimate the lengths and then measure the lengths. They may record their results on a chart.

### Using the Page

- Discuss with the children what they are to do for the chart at the top of the page. You may wish to have the children work in pairs, taking turns estimating and measuring. As suggested in *Before Using the Page*, have them use two markers to show the limits of the estimate of each distance. For the second part of the page, have the children estimate each distance suggested and then measure the distance to the nearest whole number of metres.



## LESSON OUTCOME

Complete addition facts for sums of 13

### Materials


display board and cutouts, flash card for the word *thirteen*

### Vocabulary

thirteen

## RELATED ACTIVITIES


- Have children color squares to illustrate the basic addition facts having sums of 13 as suggested in *Related Activities* on page T114.



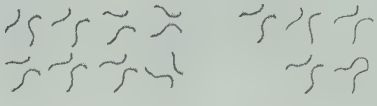
$$10 + 3 = 13$$

thirteen

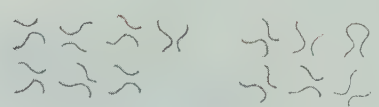
Complete the number sentences.




$$9 + 4 = 13$$




$$8 + 5 = 13$$



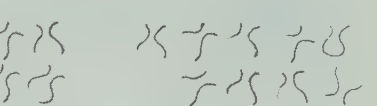
$$7 + 6 = 13$$



$$6 + 7 = 13$$



$$5 + 8 = 13$$



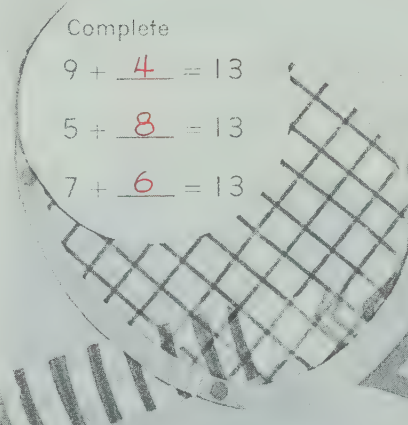
$$4 + 9 = 13$$

Complete

$$9 + 4 = 13$$

$$5 + 8 = 13$$

$$7 + 6 = 13$$



$$5 + 8 = 13$$

$$7 + 6 = 13$$

$$9 + 4 = 13$$

94 (ninety-four)

Addition facts, sums of 13

## LESSON ACTIVITY

### Before Using the Page

- Ask a child to place twelve cutouts on the display board. Place one more cutout on the display board and ask how many cutouts there are now. Review the word *thirteen* and the numeral 13. Ask several children to print the numeral on the chalkboard. Use a flash card for the word *thirteen* throughout the day to reinforce recognition of the word.
- Ask one child to partition the set of the thirteen cutouts on the display board to show a group of ten and three more. Ask how many tens there are and how many single ones there are. Have the children say, "Thirteen is one ten and three more."

Take one of the cutouts from the group of ten and place it with the group of three. Have the children determine how many there are in each group and state the corresponding addition sentence. Write the addition sentence ( $9 + 4 = 13$ ) on the chalkboard.


Take one of the cutouts from the group of nine and place it with the group of four. Have the children state the corresponding addition sentence and write it ( $8 + 5 = 13$ ) on the chalkboard.

Continue to move cutouts from one group to the other to develop  $7 + 6$ ,  $6 + 7$ ,  $5 + 8$ , and  $4 + 9$ . Arrange the number sentences in pairs so that the addends are the same, but interchanged; for example,  $9 + 4 = 13$  and  $4 + 9 = 13$ .

### Using the Page

- Ask how many tennis balls are shown at the top of the page. Have children read the addition phrase and the word. Read the instruction to the children. Ask how many balls there are in the first group and how many there are in the second group. Have the children trace over the dotted 9 and the dotted 4. Ask how many balls there are altogether. Have the children complete the number sentence. Then let the children complete the page independently. After they have completed the exercises, have them ring the ten red tennis balls in each of the six exercises to emphasize that 13 is 10 and 3 more.

Complete the number sentences



13 - 4 = 9

13 - 9 = 4

13 - 5 = 8

13 - 8 = 5

13 - 6 = 7

13 - 7 = 6

13 - 5 = 8

13 - 8 = 5

13 - 6 = 7

13 - 7 = 6

The sum of two numbers is 13.  
One number is 4

The other number is 9

Relating addition and subtraction facts: sums of 13

13 - 4 = 9

13 - 9 = 4

13 - 5 = 8

13 - 8 = 5

13 - 6 = 7

13 - 7 = 6

13 - 5 = 8

13 - 8 = 5

13 - 6 = 7

13 - 7 = 6

## LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 13

## Materials

display board and cutouts, thirteen counters for each child, yarn or string

## RELATED ACTIVITIES

- Have the children play the game "Lucky Thirteen" described on page T133. They may play alone or challenge a classmate to play and see who has the fewest cards left at the end of the game.

## LESSON ACTIVITY

### Before Using the Page

- Ask a child to place thirteen cutouts on the display board. Remove one and ask how many are left. Say, "Thirteen minus one equals twelve."

Start with thirteen cutouts again and continue the process of taking some away, first 2, then 3, and so on. Each time, have a child count how many are left and state the corresponding subtraction sentence.

- Write the sentences for the basic subtraction facts having minuends of 13 on the chalkboard.

$$\begin{array}{ll} 13 - 4 = \underline{\quad} & 13 - 9 = \underline{\quad} \\ 13 - 5 = \underline{\quad} & 13 - 8 = \underline{\quad} \\ 13 - 6 = \underline{\quad} & 13 - 7 = \underline{\quad} \end{array}$$

Have the children complete the subtraction sentences with the help of their counters.

- Ask a child to place thirteen cutouts inside a loop of yarn or string on the display board. Have another child partition the set to show 9 and 4. Lead the children to suggest two addition sentences as a result of the partitioning ( $9 + 4 = 13$  and  $4 + 9 = 13$ ).

Write the sentences on the chalkboard. Cover the four cutouts and ask how many are left. Have a child write the corresponding subtraction sentence. Cover the nine cutouts and repeat the procedure.

- Ask the children to separate their thirteen counters into groups of eight and five. Have them suggest two addition and two subtraction sentences. Write the four sentences on the chalkboard. Repeat the procedure for groups of seven and six.

### Using the Page

- Read the instruction and have the children interpret the first illustration. Discuss the first subtraction sentence. Ask what number completes the second subtraction sentence. Then have the children complete the four related number sentences.

Have the children complete the left part of the page first. Then they may complete the addition and subtraction facts at the right. Remind the children to note whether the symbol  $+$  or  $-$  tells them what they are to do.

For the problem at the bottom of the page, help those children who have difficulty reading or interpreting the words. Children may need to use their counters to help solve this problem.



# LESSON OUTCOME

Complete addition facts for sums of 14

## Materials

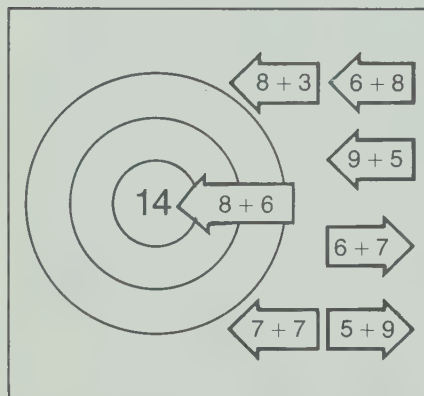
display board and cutouts, flash card for the word *fourteen*

## Vocabulary

fourteen

## RELATED ACTIVITIES

- Have the children color squares to illustrate the basic addition facts having sums of 14 as suggested in *Related Activities* on page T114.
- Prepare a work sheet on which there is a target and several arrows showing addition phrases, some of which are names for 14. Have the children cut out the arrows showing names for 14 and paste them on the target. You may wish to have the children color the target and arrows afterward.



## LESSON ACTIVITY

### Before Using the Page

- Ask a child to place thirteen cutouts on the display board. Place one more cutout on the display board and ask how many cutouts there are now. Review the word *fourteen* and the numeral 14. Ask several children to print the numeral on the chalkboard. Use a flash card for the word *fourteen* throughout the day to reinforce recognition of the word.
- Ask one child to partition the set of fourteen cutouts on the display board to show a group of ten and four more. Ask how many tens there are and how many single ones there are. Have the children say, "Fourteen is one ten and four more."

Take one of the cutouts from the group of ten and place it with the group of four. Have the children determine how many there are in each group and state the corresponding addition sentence. Write the addition sentence ( $9 + 5 = 14$ ) on the chalkboard.

Take one of the cutouts from the group of nine and place it with the group of five. Have the children state the corresponding addition sentence and write it ( $8 + 6 = 14$ ) on the chalkboard.

$$\begin{array}{r} 10 + 4 \\ 14 \end{array} \quad \text{fourteen}$$

Complete the number sentences.

$$\begin{array}{r} 9 + 5 = 14 \end{array}$$

$$\begin{array}{r} 8 + 6 = 14 \end{array}$$

$$\begin{array}{r} 7 + 7 = 14 \end{array}$$

$$\begin{array}{r} 6 + 8 = 14 \end{array}$$

$$\begin{array}{r} 5 + 9 = 14 \end{array}$$

Complete.

$$\begin{array}{r} 6 + 8 = 14 \\ 9 + 5 = 14 \\ 7 + 7 = 14 \end{array}$$

96 (ninety-six)

Addition facts, sums of 14

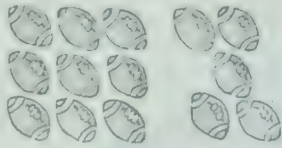
Continue to move cutouts from one group to the other to develop  $7 + 7$ ,  $6 + 8$ , and  $5 + 9$ . Arrange the number sentences in pairs so that the addends are the same, but interchanged; that is,  $9 + 5 = 14$  and  $5 + 9 = 14$ ,  $8 + 6 = 14$  and  $6 + 8 = 14$ , and the unmatched sentence  $7 + 7 = 14$ .

### Using the Page

- Ask how many bowling pins are shown at the top of the page. Have children read the addition phrase and the word. Read the instruction to the children. Ask how many bowling pins there are in the first group and how many there are in the second group. Have the children trace over the dotted 9 and the dotted 5. Ask how many bowling pins there are altogether. Have the children complete the number sentence. Then let the children complete the page independently. After they have completed the exercises, have them ring the ten purple bowling pins in each of the five exercises to emphasize that 14 is 10 and 4 more.

Complete the number sentences.

Add or subtract.



$$14 - 5 = 9$$

$$9 + 5 = 14$$

$$14 - 9 = 5$$

$$14 - 9 = 5$$

$$14 - 5 = 9$$

$$5 + 9 = 14$$



$$14 - 6 = 8$$

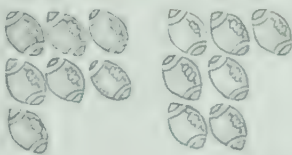
$$8 + 6 = 14$$

$$14 - 8 = 6$$

$$14 - 8 = 6$$

$$14 - 6 = 8$$

$$6 + 8 = 14$$



$$14 - 7 = 7$$

$$7 + 7 = 14$$

$$14 - 7 = 7$$



$$9 + 5 = 14$$

$$7 + 7 = 14$$

$$6 + 8 = 14$$

$$8 + 6 = 14$$

$$5 + 9 = 14$$

$$7 + 7 = 14$$



(ninety-seven) 97

## LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 14

### Materials

display board and cutouts, fourteen counters for each child

## RELATED ACTIVITIES

- The addition and subtraction facts introduced in this unit should be summarized at this point. This can be done on the chalkboard or on a sheet of cardboard to be displayed. The children may make their own summaries on a sheet of paper or in a booklet.

| 11    | 12    | 13    | 14    |
|-------|-------|-------|-------|
| 2 + 9 | 3 + 9 | 4 + 9 | 5 + 9 |
| 3 + 8 | 4 + 8 | 5 + 8 | 6 + 8 |
| 4 + 7 | 5 + 7 | 6 + 7 | 7 + 7 |
| 5 + 6 | 6 + 6 |       |       |

Review how the commutative property of addition can be used to derive the facts not listed above. The list can be used to review subtraction.

## LESSON ACTIVITY

### Before Using the Page

- Ask a child to place fourteen cutouts on the display board. Remove one and ask how many are left. Say, "Fourteen minus one equals thirteen."

Start with fourteen cutouts again and continue the process of taking some away, first 2, then 3, and so on. Each time, have a child count how many are left and state the corresponding subtraction sentence.

- Write the sentences for the basic subtraction facts having minuends of 14 on the chalkboard.

$$14 - 5 = \quad 14 - 9 = \quad$$

$$14 - 6 = \quad 14 - 8 = \quad$$

$$14 - 7 = \quad$$

Have the children complete the subtraction sentences with the help of their counters. For each sentence, have the children form a group of fourteen counters, remove the required number, and then count how many are left. Have a child complete the corresponding subtraction sentence on the chalkboard.

- Write the following number sentences on the chalkboard.

$$9 + 5 = \quad 14 - 5 = \quad$$

$$5 + 9 = \quad 14 - 9 = \quad$$

Have the children separate fourteen counters to show 9 and 5. Ask children to complete the number sentences on the chalkboard.

- Ask the children to separate their fourteen counters into groups of eight and six. Have them write the four related addition and subtraction sentences. Repeat the procedure for two groups of seven counters and the two related addition and subtraction sentences.

### Using the Page

- Read the instructions with the children and discuss the first illustration and the related number sentences as suggested for pages 87, 89, and 95. Then let the children work independently.



# LESSON OUTCOME

Add and subtract, sums and minuends of 11 to 14

## Materials

display board and cutouts

## Background

On page 42 the children were introduced to the idea of grouping two addends when finding the sum of three numbers. This concept is reviewed here and is applied particularly to finding a pair of addends having a sum of 10.

## RELATED ACTIVITIES

- Have the children use copies of page T335 to complete an addition table like the one shown below.

| + | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 |   |   |   |   |   |   |   |   |   |   |
| 1 |   |   |   |   |   |   |   |   |   |   |
| 2 |   |   |   |   |   |   |   |   |   |   |
| 3 |   |   |   |   |   |   |   |   |   |   |
| 4 |   |   |   |   |   |   |   |   |   |   |
| 5 |   |   |   |   |   |   |   |   |   |   |
| 6 |   |   |   |   |   |   |   |   |   |   |
| 7 |   |   |   |   |   |   |   |   |   |   |
| 8 |   |   |   |   |   |   |   |   |   |   |
| 9 |   |   |   |   |   |   |   |   |   |   |

- Children in groups of two to four may practise addition and subtraction facts by playing the game "Fact Pace" described on page T133.

$$6 + 4 + 3 = 13 \quad 2 + 5 + 5 = 12$$

Add by finding 10 first.

$$\begin{array}{l} 5 + 5 + 2 = 12 \\ 2 + 8 + 1 = 11 \\ 4 + 3 + 7 = 14 \\ 4 + 5 + 5 = 14 \\ 3 + 7 + 3 = 13 \end{array} \quad \begin{array}{l} 2 + 2 + 8 = 12 \\ 4 + 6 + 2 = 12 \\ 1 + 9 + 4 = 14 \\ 2 + 8 + 2 = 12 \\ 6 + 4 + 1 = 11 \end{array}$$

$$\begin{array}{r} 7 \\ 3 \\ + 2 \\ \hline 12 \end{array} \quad \begin{array}{r} 3 \\ 2 \\ + 8 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 3 \\ 1 \\ + 9 \\ \hline 13 \end{array} \quad \begin{array}{r} 5 \\ 5 \\ + 3 \\ \hline 13 \end{array}$$

Complete.

$$\begin{array}{l} 3 + 7 + \underline{2} = 12 \\ 4 + 6 + \underline{4} = 14 \\ \underline{3} + 2 + 8 = 13 \end{array} \quad \begin{array}{l} 9 + 1 + \underline{1} = 11 \\ \underline{3} + 5 + 5 = 13 \\ 8 + \underline{4} + 2 = 14 \end{array}$$

Subtract.

$$\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array} \quad \begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 13 \\ - 9 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 11 \\ - 7 \\ \hline 4 \end{array} \quad \begin{array}{r} 13 \\ - 8 \\ \hline 5 \end{array} \quad \begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array} \quad \begin{array}{r} 14 \\ - 5 \\ \hline 9 \end{array}$$

98 (ninety-eight)

Addition and subtraction practice, sums and minuends of 11 to 14

## LESSON ACTIVITY

### Before Using the Page

- Ask a child to place fourteen cutouts on the display board. Ask another child to rearrange the cutouts to show a group of ten and single ones. Remind the children that fourteen is one ten and four more. Write the sentence  $10 + 4 = 14$  on the chalkboard.
- Ask a child to remove one of the cutouts to show one ten and three more. Ask how many there are altogether. Write the sentence  $10 + 3 = 13$  on the chalkboard. Continue to have children remove one cutout in turn to review the addition facts  $10 + 2 = 12$  and  $10 + 1 = 11$ .
- Have a child remove one of eleven cutouts and state how many there are. Have children partition the group of ten cutouts in as many different ways as possible. For each way, have a child write the addition sentence on the chalkboard.
- Write the addition sentence  $6 + 4 + 5 = \underline{\hspace{2cm}}$  on the chalkboard. Ask the children which two numbers have a sum of 10. Draw a ring around 6 + 4. Ask what the sum of 6 + 4 + 5 is. Write 15 to complete the sentence. Ask if the answer would be different if 5 and 4 were added first and then 6. The children will

- remember or rediscover that the sum does not change when the grouping of addends is changed. However, almost all of the children will agree that it is easier to add 10 and 5 than it is to add 9 and 6. Repeat the procedure for the sentence  $3 + 5 + 5 = \underline{\hspace{2cm}}$ .
- On the chalkboard, write three addends in vertical form, using exercises similar to those in the previous activity. Encourage the children to group first the two addends that have a sum of 10.
- Write addition sentences having one of the three addends missing. The two addends shown should have a sum of 10, for example,  $4 + 6 + \underline{\hspace{2cm}} = 14$ . Have the children complete the sentences.
- Review the basic subtraction facts in vertical form for minuends of 11, 12, 13, and 14.

### Using the Page

- Discuss the two examples at the top of the page and then let the children work independently. You may wish to have the children ring the two numbers that have a sum of 10 before they complete each exercise.

Tony kept a record of his money for ten weeks.  
Complete Tony's record.

| Week | I have | I get | I now have  | I spend | I have left |
|------|--------|-------|-------------|---------|-------------|
| 1    | 8¢     | 3¢    | <u>11</u> ¢ | 6¢      | <u>5</u> ¢  |
| 2    | 5¢     | 9¢    | <u>14</u> ¢ | 7¢      | <u>7</u> ¢  |
| 3    | 7¢     | 6¢    | <u>13</u> ¢ | 8¢      | <u>5</u> ¢  |
| 4    | 5¢     | 8¢    | <u>13</u> ¢ | 4¢      | <u>9</u> ¢  |
| 5    | 9¢     | 3¢    | <u>12</u> ¢ | 6¢      | <u>6</u> ¢  |
| 6    | 6¢     | 6¢    | <u>12</u> ¢ | 9¢      | <u>3</u> ¢  |
| 7    | 3¢     | 10¢   | <u>13</u> ¢ | 5¢      | <u>8</u> ¢  |
| 8    | 8¢     | 6¢    | <u>14</u> ¢ | 9¢      | <u>5</u> ¢  |
| 9    | 5¢     | 7¢    | <u>12</u> ¢ | 8¢      | <u>4</u> ¢  |
| 10   | 4¢     | 7¢    | <u>11</u> ¢ | 2¢      | <u>9</u> ¢  |

Adding and subtracting with money amounts to 14 cents

(ninety-nine) 99

## LESSON OUTCOME

Add and subtract amounts of money, to 14 cents

## Materials

real money, play money, or coin cutouts from copies of page T327, cards showing sets of coins having values to 14¢, flash cards showing amounts to 14¢, several long envelopes showing a chart, play store

## Vocabulary

record, spend

## RELATED ACTIVITIES

- Prepare work sheets as shown. The children may work with these in their spare time.

| I have | I get | I now have |
|--------|-------|------------|
| 5¢ 1¢  | 7¢    | 13¢        |

| I have | I spend  | I have left |
|--------|----------|-------------|
| 10¢    | 1¢ 1¢ 1¢ | 7¢          |

## LESSON ACTIVITY

### Before Using the Page

- Review the penny, nickel, dime, and their values.
- Have children state the values (to 14¢) of sets of coins displayed on cards.
- Use flash cards showing amounts from 1¢ to 14¢ or show pictures of objects marked with prices from 1¢ to 14¢. Have the children state what coins they would use to pay the exact amount for each item. Where possible, have the children suggest more than one way to pay for an item. For example, for 11¢ they may use 11 pennies, 1 dime and 1 penny, 1 nickel and 6 pennies, or 2 nickels and 1 penny. Also discuss which way requires the fewest coins.
- Draw a chart as shown on the front of each of several long envelopes.

| Name | I have | I get | I now have | I spend | I have left |
|------|--------|-------|------------|---------|-------------|
|      |        |       |            |         |             |
|      |        |       |            |         |             |
|      |        |       |            |         |             |

Insert coins for amounts from 3¢ to 8¢ and a slip of paper on which an amount of money is shown, which when added to the amount in the envelope does not exceed 14¢. Give one envelope to each child. Have the children print their names in the first column, determine the amount of money in the envelope, and show this in the second column. They obtain more coins (according to the slip of paper) from a child appointed as "banker" and write the amount in the third column. The total amount of money (not to exceed 14¢) is written in the fourth column. Now each child purchases an item from the play store and pays for the item from the money in the envelope. The child records the amount spent in the fifth column, calculates the amount left, and shows this in the last column.

### Using the Page

- Discuss the fact that some children like to keep a record of their own money. Have the children read the headings of the chart and point out that this is one boy's record for a period of ten weeks. The chart is self-checking because the amount left at the end of one week must equal the amount for the beginning of the next week.



## LESSON OUTCOME

Recognize the following three-dimensional shapes: cone, cube, cylinder, sphere, rectangular prism, triangular prism

### Materials

wooden or plastic three-dimensional models

### Vocabulary

cone, cube, cylinder, sphere, rectangular prism, triangular prism

## RELATED ACTIVITIES

- Have the children bring objects from home that have shapes similar to the three-dimensional models. The chart from *Before Using the Page* will provide ideas. The objects may be displayed and used for reviewing the different shapes by having children match the objects with the shapes they resemble. You may wish to use the patterns on pages T325 and T326 to make paper models to display beside the objects.

Mark the shape most like each object.

| Object \ Shape | Cube | Rectangular prism | Cylinder | Sphere | Triangular prism | Cone |
|----------------|------|-------------------|----------|--------|------------------|------|
| Can            |      |                   | ✓        |        |                  |      |
| Orange         |      |                   |          | ✓      |                  |      |
| Book           |      | ✓                 |          |        |                  |      |
| Balloon        |      |                   |          | ✓      |                  |      |
| Party hat      |      |                   |          |        |                  | ✓    |
| Can (Tuna)     |      |                   | ✓        |        |                  |      |
| Block (A)      | ✓    |                   |          |        |                  |      |
| Sandwich       |      |                   |          |        | ✓                |      |
| Funnel         |      |                   |          |        |                  | ✓    |
| Candle         |      |                   | ✓        |        |                  |      |

100 (one hundred)

Recognizing three-dimensional shapes

## LESSON ACTIVITY

### Before Using the Page

- Place three-dimensional models on display for several days before this lesson. Encourage the children to build towers and walls and other structures so that they will make discoveries about the individual shapes. The shapes needed for the page are the cone, cube, cylinder, sphere, rectangular prism and triangular prism, but other shapes may also be used, such as the triangular pyramid and the square pyramid. Print the names on cards and tape the cards to the corresponding shapes. For each group of children at the "Shape Centre", guide the exploration with directions such as:

"Choose a shape that comes to a sharp point at the top."

"Which shapes have no sharp corners?"

"Which shape reminds you of a shoe box?"

"What does this shape (cylinder) remind you of?"

- Display the shapes where all the children can view them easily. Pick up the cube. Say, "This shape reminds me of an ice cube." Then place the cube apart from the others. Have children choose a shape that reminds them of something familiar and tell what it is.

- Show or suggest objects and have the children find the corresponding shapes. For example, "Find two shapes that together suggest a cone of ice cream." The children may be able to invent similar problems for other children to solve.
- Have the children help to make a chart showing familiar objects that resemble the six different shapes.

|        |        |            |          |      |            |
|--------|--------|------------|----------|------|------------|
|        |        |            |          |      |            |
| candle | funnel | sugar cube | baseball | tent | tissue box |

### Using the Page

- Have the children identify the ten objects shown on the left side of the page (can, orange, book, balloon, party hat, can, block, sandwich, paper cup, candle). Discuss the first object with the children. Ask which shape the can resembles the most. Ask if they know the name of the shape. Have the children mark a check for the appropriate shape for each of the objects.

# LESSON OUTCOME

Recognize properties of three-dimensional shapes

## Materials

wooden or plastic three-dimensional models, a board, chalk or Plasticine, a sheet of paper for each child

## Vocabulary



roll, slide, stack, face, surface

## RELATED ACTIVITIES



- Have the children look at two three-dimensional shapes and point out their similarities and differences.
- Have the children place their hands behind their backs. Place a solid in each child's hands. Ask the children to identify the solids they are holding. If a child cannot recall the name, have her/him point to a shape like it.
- Have the children tape cutouts of two-dimensional shapes to the faces of three-dimensional shapes.

Complete.





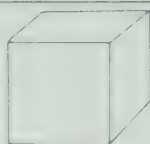
How many  faces? 4  
How many  faces? 2  
How many faces in all? 6





How many  faces? 3  
How many  faces? 2  
How many faces in all? 5



How many  faces? 4  
How many  faces? 1  
How many faces in all? 5



How many  faces? 0  
How many  faces? 6  
How many faces in all? 6

Ring the ones that you can roll.



Check the ones that you can stack



Recognizing properties of three-dimensional shapes

(one hundred one) 101

## LESSON ACTIVITY

### Before Using the Page

- Review the three-dimensional shapes from the previous lesson. Have the children recall the names of some of the shapes.
- Place a cube and a cylinder on a board or other surface that has a slight slope. Ask the children to observe which will roll on the board and which will not. Have children test other pairs of solids in a similar manner. Try to have them discover that some solids roll in one position but slide in another position (cylinder, cone).
- Use paper shapes to review the terms *triangle*, *square*, *rectangle*, and *circle*. Trace around one triangular face of a triangular prism on the chalkboard. Ask the children to name the shape. Then introduce the word *face* casually by saying, "Does this prism have another face the shape of a triangle?" Have a child trace around the other triangular face. Mark each face of the solid with chalk or a bit of Plasticine to show that the face has been traced. Trace and mark the remaining faces of the prism in a similar manner. Ask the name of the shape of the remaining faces. Then have the children state the number of triangular

faces and the number of rectangular faces there are for the triangular prism. Point out that faces are flat, smooth surfaces.

Hold up a cylinder. Point to one circular face. Ask the children, "What shape is this face?" Point to the other circular face and ask the same question. Then indicate the curved lateral surface of the cylinder and ask the children, "Why is this surface not called a face?" Lead them to suggest that because the surface is not flat, it is not considered a face. Ask which three-dimensional solid has no faces (sphere).

- Give each child a sheet of paper and a three-dimensional solid. Have the children trace around each face of the solid, marking the face after it has been traced. Have them record the number of faces of each particular shape.

### Using the Page

- Point to each of the four three-dimensional shapes, in turn, and have children identify them. Then have the children determine the number of each kind of face. Many children will need to work with models to help complete the three types of exercises on this page.



## LESSON OUTCOME

Write a number sentence for a story problem and answer the question of the problem







### Materials









fourteen counters for each child








## RELATED ACTIVITIES

- Place 14 blocks in a box. Take 6 blocks out of the box and place them on a table. Ask a child to take some blocks from the table and return them to the box, or to take some blocks out of the box and place them with the others on the table. Each time this is done, have other children tell what happened and state the number sentence. For example, "There were 6 blocks on the table. Sue put 3 more blocks on the table. Then there were 9 blocks in all ( $6 + 3 = 9$ )."
- Create several word problems related to the children and the classroom environment. Record the problems on a tape cassette. Have small groups of children listen to and solve the problems. One such problem might be "Ann brought three cookies to eat at recess. She gave one cookie to Jimmy and ate the others. How many cookies did Ann eat?"

Write a number sentence for each problem.  
Show the answer.

|   |  |
|---|--|
| Pat had 9  's.       | Bob had 12  's.         |
| She got 4 more.   | He gave 6 away.  |
| How many  's in all? | How many  's were left? |
| $9 + 4 = 13$  | $12 - 6 = 6$   |
| <u>13</u>  's        | <u>6</u>  's            |

|   |  |
|---|--|
| Bob has 5  's.       | Pat had 13  's.         |
| Pat has 6  's.       | She gave Bob 8  's.     |
| How many  's in all? | How many  's were left? |
| $5 + 6 = 11$  | $13 - 8 = 5$   |
| <u>11</u>  's        | <u>5</u>  's            |

|  |   |
|--|---|
| Pat had 10  's.          | Bob had 7  's.        |
| She spent 4  's.        | He bought 7 more.   |
| How many  's were left? | How many  's in all? |
| $10 - 4 = 6$   | $7 + 7 = 14$  |
| <u>6</u>  's            | <u>14</u>  's        |

102 (one hundred two)

Solving problems, sums and minuends to 14




## LESSON ACTIVITY


### Before Using the Page

- Give children different numbers of counters (fewer than 10). Have a child say, "I have (9) counters." Then you say, "I have (5) counters. How many do we have in all?" Repeat this with several children.
- Have the children use 14 counters and work in pairs while you direct the activity. Tell a story and have them illustrate the problem and write a number sentence. Start with this story: "You have 6 counters. Your friend has 7 counters. How many do you and your friend have in all?" Make up other stories.
- Have a child select a number of counters and say, "I have (12) counters." Then you say, "I am taking (8) of the counters. How many counters are left?" Repeat the procedure with other children. Have children write the corresponding subtraction sentences on the chalkboard.
- Have the children use their counters and work in pairs as before. Tell a story and have them illustrate the problem and state a number sentence. Start with this story: "You have 11

counters. You give 4 counters to your friend. How many counters do you have left?" Make up other stories.

- Write an addition or a subtraction sentence on the chalkboard, for example,  $3 + 8 = 11$ . Tell the children that this story fits the sentence: "I had 3 shells. I went to the beach and found 8 more shells. How many shells do I have now?" Have children suggest other stories that fit the sentence.
- Write word problems on the chalkboard, using drawings where possible. Have the children read the words and interpret the problem. Then have them solve the problem. For example,

Jim had 5  's.  
He gave away 2  's.  
How many  's were left?

        's

### Using the Page

- Read the instructions to the children. Have children help to read the words of each problem. Then let the children work independently. Give help to those children whose reading skills may be inadequate for this page.

# OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 14

## Materials

objects for grouping by tens, flash cards for addition and subtraction facts having sums to 14

## RELATED ACTIVITIES

- Prepare work sheets for the children to match names for the same number.

|        |        |
|--------|--------|
| 7 + 4  | 7 + 5  |
| 3 + 6  | 12 - 4 |
| 14 - 6 | 11 - 2 |
| 10 + 2 | 3 + 8  |
| 14 - 7 | 4 + 4  |
| 3 + 4  | 10 + 2 |
| 6 + 6  | 9 - 2  |
| 13 - 5 | 13 - 6 |

- Use copies of page T332 for preparing charts for the children to practise basic addition and subtraction facts having sums to 14.

|     |   |    |
|-----|---|----|
| Add | + | 3  |
| 7   |   | 10 |
| 4   |   | 7  |
| 8   |   | 11 |
| 6   |   | 9  |
| 9   |   | 12 |
| 5   |   | 8  |

|   |    |
|---|----|
| + | 8  |
| 4 | 12 |
| 0 | 8  |
| 2 | 10 |
| 6 | 14 |
| 3 | 11 |
| 5 | 13 |

|          |   |   |
|----------|---|---|
| Subtract | - | 4 |
| 11       |   | 7 |
| 9        |   | 5 |
| 13       |   | 9 |
| 10       |   | 6 |
| 4        |   | 0 |
| 12       |   | 8 |

|    |   |
|----|---|
| -  | 7 |
| 7  | 0 |
| 14 | 7 |
| 10 | 3 |
| 12 | 5 |
| 13 | 6 |
| 11 | 4 |

|   |    |
|---|----|
| + | 5  |
| 6 | 11 |
| 3 | 8  |
| 5 | 10 |
| 8 | 13 |
| 7 | 12 |
| 9 | 14 |

|   |    |
|---|----|
| + | 9  |
| 1 | 10 |
| 4 | 13 |
| 2 | 11 |
| 0 | 9  |
| 3 | 12 |
| 5 | 14 |

|    |   |
|----|---|
| -  | 6 |
| 11 | 5 |
| 13 | 7 |
| 10 | 4 |
| 12 | 6 |
| 14 | 8 |
| 9  | 3 |

|    |   |
|----|---|
| -  | 5 |
| 12 | 7 |
| 9  | 4 |
| 11 | 6 |
| 10 | 5 |
| 13 | 8 |
| 14 | 9 |

Addition and subtraction practice sums and minuends to 14

(one hundred three) 103

## LESSON ACTIVITY

### Before Using the Page

- Have the children use objects for grouping by tens. Ask them to make groups of ten and fasten them with a rubber band, pipe cleaner, or twist tie.

Have a child write the numeral for fourteen on the chalkboard. Ask the children to take 14 ones and regroup them to form tens and ones. Ask how many tens and ones there are. Repeat the procedure for 13, 12, 11, and 10.

- Review the basic addition and subtraction facts having sums to 10. Repeat for the basic facts having sums from 11 to 14. You may use flash cards with all the children in one large group, or the children may use the flash cards and work in small groups.

- Draw on the chalkboard the addition chart shown. Point to the 7, the +, and the 4 as you ask, "What is the sum of 7 and 4?" Write the sum in the frame beside the 7. Repeat the procedure for 3 and 4. Then have a child point to and state the numbers being considered, and write the sum of 6 and 4. Have other children complete the chart in a similar way.

|   |    |
|---|----|
| + | 4  |
| 7 | 11 |
| 3 |    |
| 6 |    |
| 4 |    |
| 9 |    |
| 8 |    |

- Draw a chart similar to the one in the preceding activity and use it for practice in subtraction.

### Using the Page

- Direct the children's attention to the two instructions at the top of the page. Discuss the completed addition exercise in the chart at the left and the completed subtraction exercise in the chart at the right. Then let the children work independently.



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## Materials

demonstration number line or work sheets of number lines, flash cards for addition and subtraction facts having sums of 11 to 14, three-dimensional models, a piece of string one metre long for each child, demonstration thermometer

## RELATED ACTIVITIES

- Use the activity and the game "Cover-up" described on page T133.

Complete.

$$5 + 6 = \underline{11}$$

$$12 - 6 = \underline{6}$$

$$9 + 5 = \underline{14}$$

$$11 - 4 = \underline{7}$$

$$8 + 5 = \underline{13}$$

$$13 - 8 = \underline{5}$$

$$\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array}$$





$$\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$$


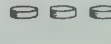


$$\begin{array}{r} 13 \\ - 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 7 \\ + 5 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$$

  $8 + 4 = \underline{12}$   
  $4 + \underline{8} = \underline{12}$   
  $\underline{12} - 4 = \underline{8}$   
  $\underline{12} - 8 = \underline{4}$

  $6 + \underline{7} = \underline{13}$   
  $\underline{7} + 6 = \underline{13}$   
  $\underline{13} - 6 = \underline{7}$   
  $\underline{13} - 7 = \underline{6}$

$$3 + 7 + 4 = \underline{14}$$

$$5 + 5 + 2 = \underline{12}$$

$$3 + 6 + 4 = \underline{13}$$

I have 6¢.

I had 13¢.

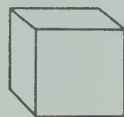
I get 5¢ more.

I spent 8¢.

Now I have 11 ¢.

Now I have 5 ¢.

Ring the number of faces.



3 4 5 6 7

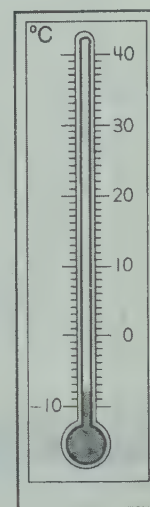


2 3 4 5 6

Measure with a paper clip.

This page is about 9 clips long.

This page is about 7 clips wide.



8 °C below zero

104 (one hundred four)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- Review the basic addition and subtraction facts having sums to 14, especially those from 11 to 14, as follows:

1. Write addition and subtraction sentences on the chalkboard. Have the children use the demonstration number line or a work sheet showing number lines to illustrate the sentences.
2. Use flash cards showing addition and subtraction facts. Have the children respond by using their number concept cards or by stating the answers orally.
3. Present a "number trio" in a diagram as shown. Have the children write all the related addition and subtraction sentences.

|    |   |
|----|---|
| 11 |   |
| 8  | 3 |

$$8 + 3 = 11$$

$$3 + 8 = 11$$

$$11 - 3 = 8$$

$$11 - 8 = 3$$

|    |   |
|----|---|
| 14 |   |
| 7  | 7 |

$$7 + 7 = 14$$

$$14 - 7 = 7$$

- Review addition with three addends when two of the addends have a sum of 10. Write  $\underline{\quad} + \underline{\quad} + \underline{\quad} = 14$  on the

chalkboard. Have a child write a number less than 10 for the first addend. Have another child write a number for the second addend so that the sum of the two numbers is 10. Have another child choose the third addend so that the sum of the three numbers is 14. Repeat the procedure for sums of 11, 12, and 13.

- Tell the children a story that illustrates an additive or a subtractive situation. Have them write the corresponding sentence and answer the question of the problem.
- Review the meaning of the word *face*, and the shapes of and the number of faces for three-dimensional models.
- Have the children use pieces of string one metre long to measure around various objects and state whether the distance is the same as, longer than, or shorter than one metre.
- Have children read temperatures above zero and below zero.

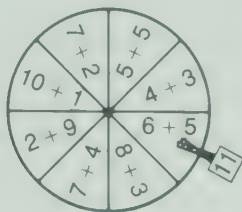
### Using the Page

- Direct the children's attention to the word *Checkup* at the bottom of the page. Review the purpose of this page. Read each instruction with the children to ensure that they know what they are to do. Let the children work independently while you help those who are having difficulty.

## Games and Activities

### Activity for page 86

Cut a circular shape from Bristol board and divide it into eight parts. Write an addition phrase for a sum of 11 or less in each part. Write the numeral 11 on several clothes pins and have children clip one beside each phrase for a sum of 11.



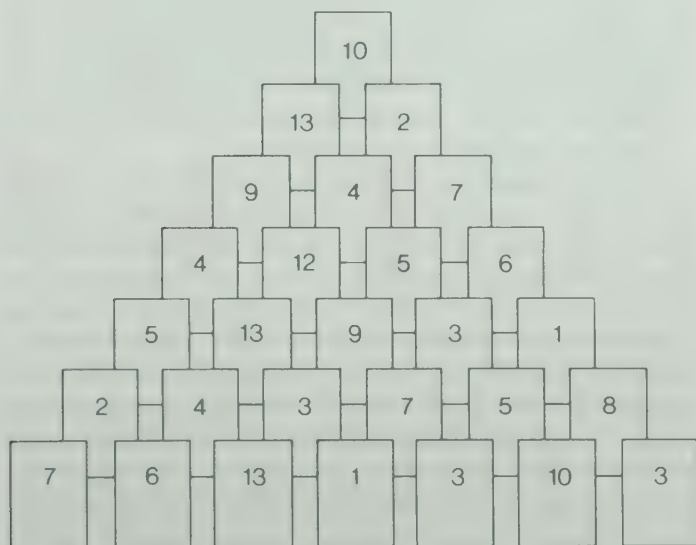
### Lucky Thirteen (Game for page 95)

#### Materials

a set of 52 cards consisting of four cards for each of the numbers from 1 to 13 (playing cards may be adapted)

#### Rules

1. Deal the first 28 cards face up in a pyramid arrangement having 7 cards in the bottom row as shown in the example below.
2. Place the remaining cards face down in a drawing pile.
3. Two cards may be removed from the pyramid if the sum of the two numbers is 13 and if there are no cards overlapping them.
4. A card marked with the numeral 13 may be removed if no other card overlaps it.
5. When all the possible cards have been removed from the pyramid, cards may be taken from the drawing pile.
6. One card is turned up at a time to see whether it can be paired with a free card in the pyramid to make a sum of 13.
7. The object of the game is to remove all the cards from the pyramid without going through the cards of the drawing pile more than twice.



### Fact Pace (Game for page 98)

#### Materials

a game board showing a number line for 0 to 100  
a marker for each player  
a set of addition and subtraction fact cards for sums and minuends to 14

#### Rules

1. The players begin with their markers at zero on the number line.
2. The cards are shuffled and placed face down.
3. The first player turns the top card face up, states the sum (difference) for the number phrase shown, and moves her/his marker the corresponding number of steps. Then the next player has a turn.
4. The first player to reach 100 is the winner.

### Activity for page 104

Have the children prepare a table showing the addition combinations for the numbers from 10 to 14. Have them observe the patterns formed by looking across the rows and down the columns.

| 10     | 11     | 12     | 13     | 14     |
|--------|--------|--------|--------|--------|
| 10 + 0 | 10 + 1 | 10 + 2 | 10 + 3 | 10 + 4 |
| 9 + 1  | 9 + 2  | 9 + 3  | 9 + 4  | 9 + 5  |
| 8 + 2  |        |        |        |        |

You may also wish to have the children make a similar table showing the subtraction combinations for minuends from 10 to 14.

| 10     | 11     | 12     | 13     | 14     |
|--------|--------|--------|--------|--------|
| 10 - 0 | 11 - 0 | 12 - 0 | 13 - 0 | 14 - 0 |
| 10 - 1 | 11 - 1 | 12 - 1 | 13 - 1 | 14 - 1 |
| 10 - 2 | 11 - 2 | 12 - 2 | 13 - 2 | 14 - 2 |
| 10 - 3 |        |        |        |        |

### Cover-up (Game for page 104)

#### Materials

a game board as shown  
twelve markers for each board  
two regular dice

|   |   |   |   |   |   |   |   |   |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|

#### Rules

1. A player rolls the dice and finds the sum of the numbers rolled.
2. The player covers one number for the sum obtained or any two or more numbers having that sum.
3. Play continues until the player rolls a sum for which there are no addends available on the game board.
4. The winner may be determined in either of two ways:  
The player who has the fewest numbers uncovered;  
The player who has the least sum for the uncovered numbers.



## Unit 6 Overview

In this unit the basic addition facts and the related subtraction facts for sums and minuends from 15 to 18 are discovered and practised together. These basic facts are then used in adding and subtracting amounts of money, to 18 cents. Subtraction is presented as the operation by which numbers can be compared and their difference found. The children also learn that the difference can indicate either how much greater one number is or how much less the other number is when two numbers are compared. Place values in two-place numerals are reviewed briefly before the addition of two-digit numbers is introduced. To ensure a meaningful development of this new skill, the topic is presented in five separate stages: tens added to tens, ones added to tens, ones added to tens and ones, tens added to tens and ones, tens and ones added to tens and ones. Regrouping is not involved and sums do not exceed 99 in this unit. Pictographs are given for children to interpret as a basis for solving simple problems using subtraction in the comparative sense. The concepts and skills of the lessons are assessed in the *Checkup* at the end of the unit.

### Unit Outcomes

#### Number

- record information from a pictograph
- complete related basic addition and subtraction facts, sums of 15, 16, 17, and 18
- use subtraction to make comparisons
- add and subtract amounts of money, to 18 cents
- recognize one-fourth of a whole; use the symbol  $\frac{1}{4}$
- identify one-fourth of a set
- interpret two-place numerals in terms of tens and ones
- add multiples of ten, sums to 90
- add multiples of ten to 90, and ones
- add two-digit numbers and one-digit numbers, no regrouping, sums to 99
- add two-digit numbers and multiples of ten, sums to 99
- complete number patterns, no regrouping, sums to 99
- add two-digit numbers, no regrouping, sums to 99
- add amounts of money, no regrouping, sums to 99 cents
- complete basic addition and subtraction facts, sums and minuends to 18

#### Measurement

- tell and show time in quarter hours

#### Background

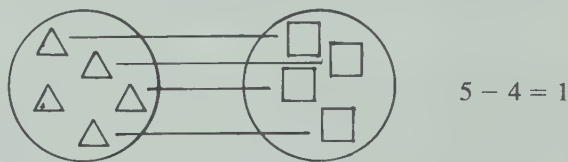
**Number:** It is stated in the overview for Unit 5 that there are only a few basic addition and subtraction facts for teen numbers. From a quick glance at part of the addition table, it can be seen that sums from 15 to 18 occur only ten times and these in turn generate ten related subtraction facts.

| + | 6  | 7  | 8  | 9  |
|---|----|----|----|----|
| 6 |    |    |    | 15 |
| 7 |    |    | 15 | 16 |
| 8 |    | 15 | 16 | 17 |
| 9 | 15 | 16 | 17 | 18 |

However, these twenty facts can be derived from only six pairs of numbers (6, 9; 7, 9; 8, 9; 7, 8; 8, 8; 9, 9) by applying the commutative (order) property of addition to each pair and then relating subtraction facts to them. If children discover and organize basic facts into sets of related facts, they can recall them much more easily than if they learn the facts singly and separately.

In Unit 1, horizontal bar graphs are presented as a means of representing and comparing data. A one-to-one scale was used to indicate the number of items in each set. Pictographs are introduced in this unit and the skills of graphing are extended by using a “key” or a many-to-one scale. The children should realize the convenience of a “key” in reducing the number of symbols required to represent the information in a pictograph.

In Unit 2, subtraction of numbers is introduced in relation to removal or separation of members from a set to find how many are left. In this unit the second use of subtraction is presented, namely, for comparison of two numbers. At the concrete level, two sets can be compared by one-to-one matching. A set of five objects has one more than four objects because there is an extra unmatched object in the set of five.



Subtraction can be used to compare numbers at the abstract level and to find their *difference*. The work in this unit is limited to finding *how many more* (how much greater), but note that the same relationship, with the same difference, can also be applied to describe *how many fewer* (how much less). For example, the sentence  $5 - 4 = 1$  can be interpreted as indicating that four is one less than five as well as the fact that five is one greater than four.

The concept *one-fourth* is relatively easy for children to acquire since the word *four*, the number of equal parts involved, is contained in the word *fourth*. It should be pointed out that each of the four parts of an object or of a set must be of the same size. It should also be noted that one-fourth of one object (set) is not the same as one-fourth of another object (set) unless the objects (sets) are identical. The word *quarter* comes from the Latin word meaning “a fourth part”. You may wish to introduce the word *quarter* as a synonym for the word *fourth*, since it is often used in telling time in quarter hours.

Two-place numerals are introduced in Unit 4 and the significance of place value is emphasized there. Emphasis is again placed on the tens and ones in such numerals because they are used in the operation of addition. In cases when one addend is a two-digit number and the other a one-digit number, extensions of basic addition facts are used. For example,  $3 + 5 = 8$  can be applied to  $13 + 5$ ,  $23 + 5$ ,  $33 + 5$ , and so on. When both addends have two digits the simple rule of adding ones to ones and tens to tens is applied. Only basic facts having sums to nine are used in this unit because sums greater than nine would involve regrouping, which occurs for the first time in Unit 8.

#### Teaching Strategies

The procedures outlined in *Before Using the Page* and in *Using the Page* should enable the children to make discoveries about the sums and minuends from 15 to 18. Mastery of the

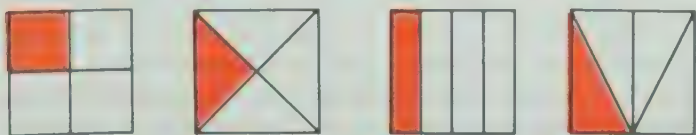
basic addition and subtraction facts should be established as a worthy goal. With the work in this unit all the basic addition and subtraction facts for sums and minuends to 18 have been developed, and the children's interests and efforts can now be turned to achieving mastery of them. Mastery means knowing the basic facts well enough that responses are virtually instantaneous. Immediate recall of sums or differences implies memorization of facts, but this need not be dull, repetitious drill. Practice with "families" of related facts makes the learning task much easier than with separate unrelated facts. Besides being more efficient as a learning technique, the "families" approach emphasizes informally the commutative property of addition and the inverse relationship between addition and subtraction. Suggestions for testing and practice appear in the overview for Unit 5. You may wish to have the children keep a chart of their progress. For example, if a child has mastered all the facts for sums and minuends to 10, he/she should then proceed to 11 and write or state all the basic addition facts having a sum of 11 and all the related subtraction facts.

#### Basic Facts of 11

|              |              |
|--------------|--------------|
| $2 + 9 = 11$ | $3 + 8 = 11$ |
| $9 + 2 = 11$ | $8 + 3 = 11$ |
| $11 - 9 = 2$ | $11 - 8 = 3$ |
| $11 - 2 = 9$ | $11 - 3 = 8$ |
| $4 + 7 = 11$ | $5 + 6 = 11$ |
| $7 + 4 = 11$ | $6 + 5 = 11$ |
| $11 - 7 = 4$ | $11 - 6 = 5$ |
| $11 - 4 = 7$ | $11 - 5 = 6$ |

As the facts for each sum or minuend are mastered they could be checked on a list. Facts that are not known well should be identified, reviewed, and practised until mastery is achieved. As stated previously, organizing the facts into sets of related facts has much merit and is recommended.

In connection with the lessons dealing with one-fourth of an object, the fact that the four parts must be of the same size should be emphasized. Some children may be interested in seeing that this does not always require the parts to be of the same shape. For example, if square sheets of paper of the same size are marked as shown, each red part is one-fourth of the sheet. Since the sheets are of the same size, the red fourths are equal in size, but different in shape.



Recording time in quarter hours requires the use of the numerals 15, 30, and 45 to indicate the minutes. The children should practise counting by fives to 60, using the marks on the dial of a clock. Special attention should be given to 15 representing one-fourth (one-quarter) of an hour, to 30 representing two-fourths (two-quarters) or one-half of an hour, and to 45 representing three-fourths (three-quarters) of an hour. Because of the increasing use of the 24-hour clock, it is desirable that the older terms "quarter past" and "quarter to" not be used, but rather the actual number of minutes past each hour; for example, "four fifteen" and "twelve forty-five" rather than "a quarter past four" and "a quarter to one".

Abacus charts and place-value pocket charts are recommended for addition with two-digit numbers. Note that for the place-value pocket chart shown on page xxxi and recommended for use on page T159, a single item "worth" ten is used in the tens' place rather than a bundle of ten ones. This is one step closer to working only with numbers for which there is a single digit in each column. The procedure is outlined further in the teaching suggestions for page 125.

#### Materials

paper cutouts of buttons, buttons collected by the children  
chart paper prepared for a pictograph  
display board and cutouts, yarn  
flash cards for the words *fifteen* to *eighteen*  
a large card showing ten shapes and another showing five shapes  
eighteen counters for each child  
a number line for each child  
nine red blocks and nine blue blocks  
dice, two markers  
demonstration number strips, number strips for each child (optional)  
small objects for making sets  
real money, play money, or coin cutouts from copies of page T327  
play store or store chart, "bills" for recording purchases (optional)  
objects marked with prices from 2¢ to 10¢, other objects marked with various prices to 99¢  
objects to be cut into fourths (apples, sandwiches, ribbon, paper strips)  
cutouts for showing fourths  
square, rectangular, and circular pieces of paper  
real clock, demonstration clock face  
a paper-plate clock face for each child  
flash cards showing times (optional)  
objects for grouping by tens  
an abacus chart for each child  
demonstration number line for 0 to 100, matching number strips for 1 to 10  
place-value pocket chart and sticks (See page xxxi.)  
pocket chart and 36 cards showing the basic addition facts in vertical form for sums from 11 to 18  
a piece of cardboard, a paper clip, and a pronged paper fastener for each child to make a number spinner

#### Vocabulary

|            |                   |
|------------|-------------------|
| fifteen    | number square     |
| sixteen    | one-fourth        |
| seventeen  | fourths           |
| eighteen   | digit             |
| difference | place-value chart |



## Unit 6 Theme – Collections

The purpose of this theme is to help the children realize that collecting can be a worthwhile and rewarding hobby. It is hoped that they will acquire new information and develop new interests as well as appreciate the interests of others.

Set aside part of the classroom for displaying samples of collections as well as the collections that will be made for this theme. Include the children's written work and illustrations as they are completed.

### LANGUAGE ACTIVITIES

#### 1. Discussing Collections

Display a small collection of items, preferably of your own, to show to the class. Small glass animals, buttons, or bottles would be suitable. Allow the children to examine the collection. Discuss with the children the concept of a collection. They may suggest that it is an assortment of similar things or a group of things that belong together.

Encourage the children to share information about things they collect. Have them tell where they find the objects they collect, how they store them, how they display them, what they have learned while making their collections, and why they chose that particular item to collect.

List the things that the children in the class collect. Suggest that adults also make collections of things. Encourage the children to share information about the things that their parents collect. Make a list of these collections.

Discuss reasons why people collect things.

- One gains special knowledge about certain things.
- One becomes an expert on something.
- People enjoy finding and owning rare and unusual things.
- Collections add interest to a home.

#### 2. Sharing Time

In order to improve listening and speaking skills, reserve about fifteen minutes of each day for sharing time. Plan for three or four children to display their collections and tell about them. They may wish to tell

- how they became interested in making their collections;
- interesting facts about their collections;
- what they hope to include in their collections.

#### 3. Writing Descriptions

After the children have had experience in discussing collections, have them write a personal account of something they collect or would like to collect. This account should include

- a description of what is collected;
- how they became interested in making the collection;
- where the objects collected are found;
- how the objects are stored or displayed;
- interesting facts about the collection;
- how they hope to enlarge the collection.

### MATHEMATICS ACTIVITIES

#### 1. Classifying Objects

Provide samples of various collections, for example, rocks, seashells, stamps, post cards, sports cards, buttons, bottle caps. Have each child select a collection and classify the objects in as

many ways as possible. This information could be recorded pictorially or in a chart.

Discuss which collection could be classified in the most ways and which one could be classified in the fewest ways.

#### 2. Measuring Length

Provide examples from various collections, for example, sports cards, stamps, post cards, empty match covers, or small model cars.

Discuss the kinds of things that could be measured using these objects as non-standard units. Guide the children to see the necessity of choosing appropriate units; that is, such things as pencils, sticks of chalk, and books can be measured by using a postage stamp; but tables, desks, and bookcases are measured more efficiently by using a post card. Have each child use one of the small objects to measure five things in the classroom. Have the children estimate first and then record their information on a chart with the headings shown.

| Item to be measured | Estimate | Measurement |
|---------------------|----------|-------------|
|                     |          |             |

#### 3. Penny Collection

Ask each of the children in your class to bring a penny to school. Help them to read the year shown on each coin. Have children sort the pennies according to the year they were minted. As children read the year on each penny record it in a tally chart on the chalkboard. The pennies could be arranged to form a pictograph. After the years of all the pennies have been noted, ask children to count and record the number of pennies for each particular year. Have the children study the results. Ask questions similar to the following:

“How many pennies are there for each year?”

“In what year was the oldest penny made?”

“In what year was the newest penny made?”

“For which year were the most pennies brought to class?”

“For which year were the fewest pennies brought to class?”

“How many more pennies were brought for (1979) than for (1976)?”

“How many fewer pennies were brought for (1968) than for (1980)?”

Discuss briefly with the children the hobby of collecting coins. One or two children may have already started a coin collection at home. When the graph is no longer needed, return the pennies to the children to encourage them to start a penny collection like the one illustrated on page 125. They can try to obtain a penny for each year. They may wish to start with pennies dated as early as 1934, or they may prefer to choose a later date.

### SCIENCE ACTIVITIES

#### 1. Collections from Nature

The world around us offers a wealth of ideas for collections. It is not necessary to disrupt nature in order to have a collection of outdoor things. The technique of wax crayon rubbing will give lasting impressions without disturbing or destroying natural settings.

Place a leaf, veined side up, on a piece of soft paper such as newsprint. A book or a thin board will provide a solid surface on which to work. Cover the leaf with a second piece of paper. Firmly but gently rub the part of the paper covering the leaf with the side of a wax crayon. A clear outline of the leaf will appear on the paper. "Leaves" collected in this way can be identified in the classroom and then mounted for a permanent collection.

Impressions of the bark of various trees may also be collected the same way. For these, place one sheet of paper directly on the tree trunk and rub. It is wise to attempt to identify the tree on the site rather than in the classroom. Again, these prints can be mounted and labelled as a collection.

## 2. Seed Collections

An easy and inexpensive collection for children to make is one of seeds. The seeds can be either from things we eat or from trees, flowers, and weeds.

For a collection of seeds from things we eat, ask the children to save the seeds from fruit they eat. Have the children ask their parents to save seeds for them.

Make a list of the possible kinds of seeds and have the children try to collect as many as they can. There should be seeds from

|             |                 |
|-------------|-----------------|
| apples      | black-eye peas  |
| apricots    | chick peas      |
| avocados    | coffee beans    |
| cherries    | lentils         |
| grapes      | Lima beans      |
| lemons      | kernels of corn |
| limes       | kidney beans    |
| mangoes     | mung beans      |
| oranges     | peanuts         |
| peaches     | poppy seeds     |
| plums       | sesame seeds    |
| pumpkins    | soybeans        |
| squash      | split peas      |
| watermelons | sunflowers      |

The small clear plastic containers for prescription pills make excellent "display cases" for seeds. If you wish to have all the containers of the same size, buy them unused from a druggist. Place as many seeds as you wish in each case and label them for the children's reference.

If the children have collected more seeds than can be used in the collection, the excess seeds can be used in art projects. For example, children may enjoy creating a mosaic made from seeds. The seeds in their natural colors can be arranged attractively. If a few contrasting colors are needed, you can dye seeds, especially pumpkin seeds or squash seeds, with tempera paint or a few drops of food coloring. If you choose to dye some seeds, be sure to spread them on paper towels and let them dry thoroughly for several days.

## 3. Rock Collections

Children indicate their interest in rocks and stones as they collect them on the playground, in a park, and at the beach. Usually, they are attracted by the color or the shape of a stone. Ask the children to bring their favorite stones to class. Discuss why they have saved these particular stones.

Rocks and stones are often used in jewellery making. *Lapidary* is the art of cutting and polishing stones. In nature, stones are polished by the constant rubbing of sand, water, and wind.

In lapidary, stones are tumbled in a drum with sand and water. As a result, stones can be polished in a few weeks instead of hundreds of years. Show samples of stones that have been polished both naturally and in a tumbler. Ask the children whether they can see any difference.

Ask the children to share factual information that they have about rocks. You may wish to discuss some of the following facts:

- Most rocks are a mixture of one or more minerals.
- Some minerals occur in the form of crystals.
- Some crystals are shaped like cubes, for example, grains of salt are tiny cubes.
- Some crystals have many flat surfaces that reflect light, making them very beautiful.
- A gem is a precious stone of great cost, such as a diamond or an emerald.
- A semiprecious stone is not so rare as a precious stone and not so costly, such as jade or amethyst.
- A precious metal is found in rocks and is usually mined, such as gold or silver.

If you live in a city, arouse the children's interest in rocks by taking them on a tour to examine the exterior and interior walls of buildings. Try to find granite, limestone, marble, sandstone, and slate for the children to feel and examine. It may be possible for you to visit a location where buildings have been torn down. If so, bits of these different rocks may be found at the site. These bits of rock can be the beginning of a rock collection for your classroom.

Provide books so that children may pursue their interest in rocks and increase their knowledge of the different kinds.

## SOCIAL STUDIES ACTIVITIES

### 1. Collections from Around the World

While some collectors specialize in local items, many general collections have elements from many parts of the world.

Display a large map of the world. Provide samples of several collections such as stamps, post cards, or seashells. You will need reference books to identify the origin of the seashells. Encourage the children to locate the countries or areas of origin of each different item. Stamps or post cards can be pinned directly to the map.

### 2. A Doll Collection

Dolls have occurred in almost every part of the world since earliest times. Although they are usually used as playthings, they have also been used in religious ceremonies and witchcraft. Specific instructions for making dolls are available in popular craft books. Display some of these dolls in class and let the children try making them for a doll collection for the classroom. The following dolls can be made by young children:

|                   |                |
|-------------------|----------------|
| applehead dolls   | cornhusk dolls |
| clothes-pin dolls | spool dolls    |
| corncob dolls     | stocking dolls |

## ART ACTIVITIES

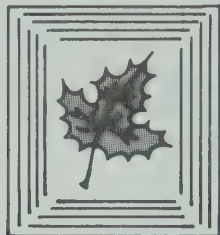
### 1. Elements of Display

A collection can be enhanced by simple and precise display techniques. These techniques should be in harmony with the collection rather than in competition. Encourage the children to experiment with various borders, frames, and backgrounds.

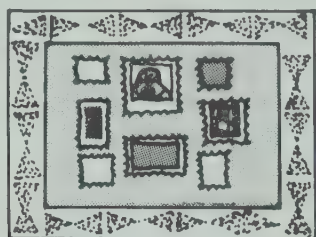


## Borders

Use line segments of graduated lengths.



Make Plasticine stamps in a teardrop or geometric shape. Dip the shape in tempera paint and stamp a border design.

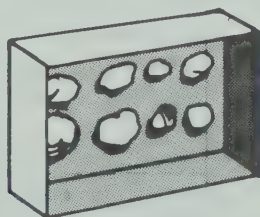


Use ribbon or fabric strips glued around the edges.



## Frames

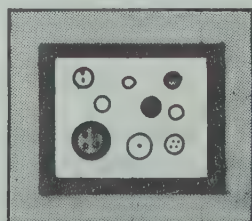
Use a sturdy box about 5 cm deep. Paint it a solid color.



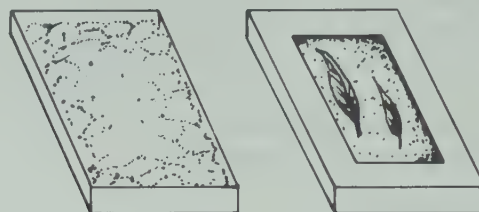
Cut a sheet of paper along dotted lines as indicated. Fold the flaps backward to form a frame. Mount the frame on a firm backing of cardboard or wood.



Frame the backing with contrasting strips of paper.



Use a shallow cardboard box with a cover. Cut a window in the cover leaving a border of about one or two centimetres all the way round. Place a layer of cotton batting in the bottom of the box. Arrange the items of the collection on the cotton. From the inside, tape clear plastic over the window in the cover. Place the cover on the box.



## Backgrounds

Cover the backing with a textured fabric such as felt, corduroy, velvet, or burlap.

Make a weak solution of tempera paint. Moisten a sponge with the paint and apply it to paper.

Stores will often give away out-of-date books of wallpaper samples. Use light-colored textured wallpaper for backgrounds.

## 2. Collage of Collections

Cover part of a bulletin board with a solid background. Make a collage using a sample of everything the children can think of that can be collected. If items are too large to mount on the bulletin board, use a picture or a drawing of the item.

## MOVEMENT ACTIVITIES

### 1. Butterfly Collector

Set up two goal lines—one at either end of the gym or on the playground. The players stand behind one goal line. The player who is the butterfly collector stands halfway between the two goals.

Choose three or four names of insects, for example, butterflies, moths, bees, and dragonflies. Assign each player to one of the teams.

To start the game the collector calls, "Butterflies, fly!" The players of that team run to the opposite goal as the collector tries to catch them. Any butterfly who is caught by the collector is put "in the butterfly net" (watches from the sidelines).

After the collector has called each of the names once, he/she calls, "Insects, fly!" All the remaining players run to the opposite goal. A new collector is chosen from among the players who reached the goal safely. Then the game continues as before.

## MUSIC ACTIVITIES


### 1. Song Collection


Make books of various songs that the children know and enjoy. Add to these collections throughout the year as new songs are learned. The children may wish to classify the songs under the following headings:

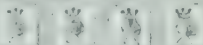
- Our Favorite Songs
- Songs About Animals
- Songs About People
- Action Songs
- Christmas Songs
- Songs from Other Countries
- Funny Songs
- Sad Songs


## Unit 6


Number of stamps each child collected

 means 10 stamps.

Pat 

Bob 


Cathy 

Peter 

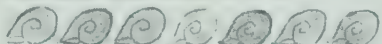
How many?

30407050

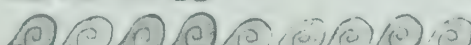
Number of shells each child collected

 means 5 shells

Bob 

Sally 


Jim 


Beth 


How many?


30352045


Number of cards each child collected

 means 2 cards.

Tom 

Jill 

Ann 

Sally 

How many?

1012168

Reading pictographs

(one hundred five) 105

## LESSON OUTCOME

Interpret a pictograph

## Materials

paper cutouts of buttons, buttons collected by the children, chart paper prepared for a pictograph

## RELATED ACTIVITIES

- Have the children prepare other pictographs. These may be based on such things as pets, cars, television programs, favorite fruits, and favorite games.






## LESSON ACTIVITY

## Before Using the Page

- Divide the class into four groups, A, B, C, and D. Give each group one container. Ask the children to bring from home as many buttons as they can and place them in their container.


Have each group count the buttons and show the number on the container. Depending on how many buttons the groups have collected, decide whether they should be grouped by twos, fives, or tens. Do not have more than nine groups.

Prepare in advance about two dozen paper cutouts of buttons and chart paper marked as shown.

| Number of buttons each group collected  |   | How many? |
|---|---|-----------|
|  means 10 buttons |   |           |
| Group A   |  | _____     |
| Group B   |  | _____     |
| Group C   |  | _____     |
| Group D   |  | _____     |

Tell the children that they are going to help make a graph to show how many buttons each group collected.

For every pile of ten buttons (or whatever number of buttons you chose), give the children one paper cutout. Ignore the remaining single buttons. When the button cutouts have been distributed, have one child from each group count by tens (fives, twos) using the paper cutouts. Members of each group should paste the cutouts on the chart paper.

Point to the "key" at the top of the graph and explain that the symbol  represents 10 (5, 2) buttons. Have the children help to complete the column labelled "How many?" Then ask:  
 "Which group collected the most (fewest) buttons?"  
 "How many buttons did the third group collect?"  
 "How many more buttons did the third group collect than the fourth group?"

## Using the Page

- Discuss the first graph. Ask how many stamps each drawing of a stamp represents. Help the children to read the names shown on the graph. Ask a child to count by tens to check that Pat collected 30 stamps. Then let the children work independently. Remind them to check the "key" each time they start a new graph.



## LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 15

## Materials

display board and cutouts, flash card for *fifteen*, a large card showing ten shapes and another showing five shapes, fifteen counters for each child

## Vocabulary

fifteen

## RELATED ACTIVITIES

- Play the game "Scoring Sets" described on page T163. The game may be played in groups of two to four players.
- You may wish to have the children ring the ten silver charms for each of the six exercises on page 106, to reinforce that 15 is 10 and 5 more.



Complete the number sentences.



$$9 + 6 = 15$$

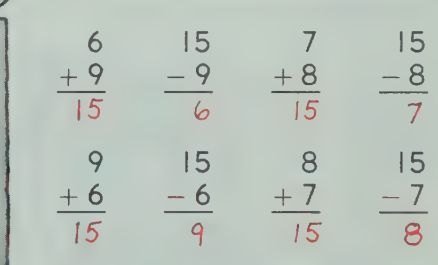
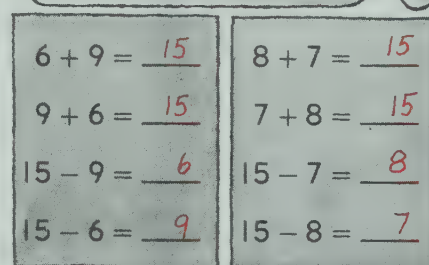
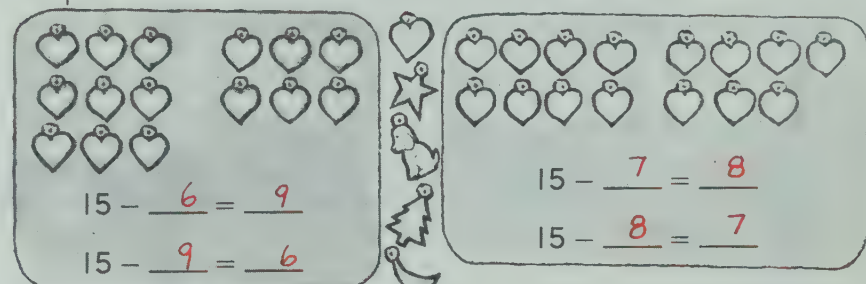
$$8 + 7 = 15$$



$$7 + 8 = 15$$

$$6 + 9 = 15$$

Complete.



106 (one hundred six)

Relating addition and subtraction facts, sums of 15

## LESSON ACTIVITY

### Before Using the Page

- Have the children count while one child places fourteen cutouts on the display board. Place one more cutout on the display board and ask how many there are now. Review the word *fifteen* and the numeral 15. Ask several children to print the numeral on the chalkboard. Use a flash card for the word *fifteen* throughout the day to reinforce recognition of the word.
- Have one child group together ten of the fifteen cutouts on the display board. Ask how many tens and ones there are. Have the children say, "Fifteen is one ten and five more."
- Display a large card showing ten shapes and a large card showing five shapes. Ask the children how many shapes are shown and write the number sentence ( $10 + 5 = 15$ ) on the chalkboard. Interchange the two cards and ask a child to state the corresponding number sentence ( $5 + 10 = 15$ ). Ask how many there are altogether and then remove the card showing the five shapes. Ask the children to state the corresponding number sentence ( $15 - 5 = 10$ ). Replace the card and use a similar procedure to develop the number sentence  $15 - 10 = 5$ .

- Remove one cutout from the group of ten on the display board and place it with the group of five. Ask how many there are in each group. Have each child separate a group of fifteen counters to show a group of nine and a group of six.

Write the following sentences on the chalkboard and have the children use their counters to illustrate each sentence. Ask children to complete the number sentences on the chalkboard.

$$9 + 6 = \underline{\quad\quad\quad} \quad 6 + 9 = \underline{\quad\quad\quad}$$

$$15 - 6 = \underline{\quad\quad\quad} \quad 15 - 9 = \underline{\quad\quad\quad}$$

Repeat for the four related addition and subtraction sentences for 8, 7, and 15.

### Using the Page

- Direct the children's attention to the charms at the top of the page. Ask how many silver charms there are, how many gold charms there are, and how many charms there are in the two sets. Have children read the numerals and the word.

Read the instruction for the exercises. Discuss the first exercise with the children and then let them work independently.

For the exercises at the bottom of the page, the children may use their counters for assistance.

Complete.

|              |              |              |
|--------------|--------------|--------------|
| $6 + 3 = 9$  | $7 + 3 = 10$ | $8 + 3 = 11$ |
| $6 + 4 = 10$ | $7 + 4 = 11$ | $8 + 4 = 12$ |
| $6 + 5 = 11$ | $7 + 5 = 12$ | $8 + 5 = 13$ |
| $6 + 6 = 12$ | $7 + 6 = 13$ | $8 + 6 = 14$ |
| $6 + 7 = 13$ | $7 + 7 = 14$ | $8 + 7 = 15$ |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| $\begin{array}{r} 9 \\ +1 \\ \hline 10 \end{array}$ | $\begin{array}{r} 9 \\ +3 \\ \hline 12 \end{array}$ | $\begin{array}{r} 9 \\ +5 \\ \hline 14 \end{array}$ | $\begin{array}{r} 5 \\ +9 \\ \hline 14 \end{array}$ | $\begin{array}{r} 3 \\ +9 \\ \hline 12 \end{array}$ | $\begin{array}{r} 1 \\ +9 \\ \hline 10 \end{array}$ |
|---|---|---|---|---|---|

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| $\begin{array}{r} 9 \\ +2 \\ \hline 11 \end{array}$ | $\begin{array}{r} 9 \\ +4 \\ \hline 13 \end{array}$ | $\begin{array}{r} 9 \\ +6 \\ \hline 15 \end{array}$ | $\begin{array}{r} 6 \\ +9 \\ \hline 15 \end{array}$ | $\begin{array}{r} 4 \\ +9 \\ \hline 13 \end{array}$ | $\begin{array}{r} 2 \\ +9 \\ \hline 11 \end{array}$ |
|---|---|---|---|---|---|

|              |              |              |
|--------------|--------------|--------------|
| $11 - 6 = 5$ | $11 - 7 = 4$ | $11 - 8 = 3$ |
| $12 - 6 = 6$ | $12 - 7 = 5$ | $12 - 8 = 4$ |
| $13 - 6 = 7$ | $13 - 7 = 6$ | $13 - 8 = 5$ |
| $14 - 6 = 8$ | $14 - 7 = 7$ | $14 - 8 = 6$ |
| $15 - 6 = 9$ | $15 - 7 = 8$ | $15 - 8 = 7$ |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| $\begin{array}{r} 13 \\ -9 \\ \hline 4 \end{array}$ | $\begin{array}{r} 11 \\ -6 \\ \hline 5 \end{array}$ | $\begin{array}{r} 11 \\ -5 \\ \hline 6 \end{array}$ | $\begin{array}{r} 15 \\ -8 \\ \hline 7 \end{array}$ | $\begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$ | $\begin{array}{r} 13 \\ -4 \\ \hline 9 \end{array}$ |
| $\begin{array}{r} 15 \\ -9 \\ \hline 6 \end{array}$ | $\begin{array}{r} 14 \\ -8 \\ \hline 6 \end{array}$ | $\begin{array}{r} 13 \\ -7 \\ \hline 6 \end{array}$ | $\begin{array}{r} 12 \\ -6 \\ \hline 6 \end{array}$ | $\begin{array}{r} 11 \\ -5 \\ \hline 6 \end{array}$ | $\begin{array}{r} 10 \\ -4 \\ \hline 6 \end{array}$ |

Addition and subtraction practice sums and minuends of 9 to 15

(one hundred seven) 107

## LESSON OUTCOME

Complete basic addition and subtraction facts, sums and minuends of 9 to 15

## Materials

counters or a number line for each child (optional)

## RELATED ACTIVITIES

- For the last row of subtraction exercises on page 107, have the children extend the pattern as far as possible to the right.

Some children may wish to write and complete their own patterns similar to those on page 107.

- For the two sets of subtraction exercises and/or the two sets of addition exercises, have the children draw lines to match related facts, for example,  $13 - 9 = 4$  and  $13 - 4 = 9$  in the second last row.

- Challenge some children to determine how many illustrations of butterflies are covered or partially covered by the exercises on page 107.

## LESSON ACTIVITY

### Before Using the Page

- Have the children use counters or a number line as needed for the following activity. Ask a child to name two numbers that have a sum of 9. Ask another child to write the addition sentence on the chalkboard, for example,  $5 + 4 = 9$ . Tell the children that you are going to change one of the two addends. Write the sentence  $6 + 4 = \underline{\quad}$  below the first sentence and ask for the sum of the two numbers. Have a child complete the addition sentence on the chalkboard. Continue to increase the first addend by one to obtain the addition sentences  $7 + 4 = 11$ ,  $8 + 4 = 12$ , and  $9 + 4 = 13$ . Ask children to describe the pattern. Lead them to suggest that as the first addend increases by one, the sum also increases by one.

Use a similar procedure to develop each sum from  $9 + 0$  to  $9 + 6$ .

- Adapt the preceding activity for patterns in subtraction. Write  $11 - 9 = \underline{\quad}$  on the chalkboard. Ask a child to complete the subtraction sentence on the chalkboard. Write  $12 - 9 = \underline{\quad}$  below the first sentence and have a child complete the sentence

on the chalkboard. Continue the procedure to obtain the subtraction sentences  $13 - 9 = 4$ ,  $14 - 9 = 5$ , and  $15 - 9 = 6$ . Ask children to describe the pattern.

Use a similar procedure to develop each of the differences from  $12 - 4$  to  $12 - 8$ .

### Using the Page

- For the addition and subtraction exercises in horizontal form, some children may wish to complete them row by row, other children may prefer to work column by column. For each method, patterns may be observed. The exercises in vertical form are best completed by rows to observe the patterns.

- After the children have completed their work, ask them to read their answers silently and note the patterns. This procedure may help them to detect errors in addition or subtraction. Then discuss the patterns shown by the answers. Note that the exercises in horizontal form show patterns both by row and by column. For example, the sums in the first row of addition exercises form the pattern 9, 10, 11; the differences in the first column of subtraction exercises form the pattern 5, 6, 7, 8, 9. Observing patterns in addition and subtraction is helpful in memorizing basic facts.



## LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 16

## Materials

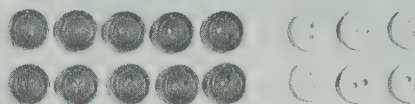
sixteen counters for each child, flash card for *sixteen*, nine red blocks and nine blue blocks

## Vocabulary

sixteen

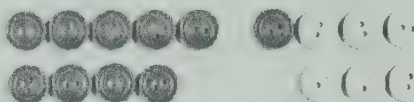
## RELATED ACTIVITIES

- Have the children color squares to illustrate the basic addition facts having sums of 16 as suggested in *Related Activities* on page T114.
- Have the children ring the ten red buttons in each of the first three exercises to emphasize that 16 is 10 and 6 more.

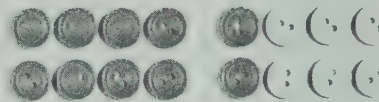


$$10 + 6 = 16 \quad \text{sixteen}$$

Complete the number sentences.



$$9 + 7 = 16$$



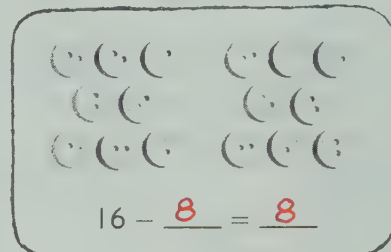
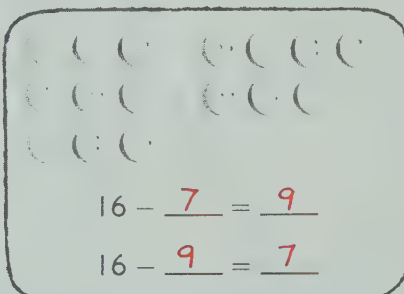
$$8 + 8 = 16$$



$$7 + 9 = 16$$



Complete.



$$9 + 7 = 16$$

$$8 + 8 = 16$$

$$7 + 9 = 16$$

$$16 - 8 = 8$$

$$16 - 7 = 9$$

$$16 - 9 = 7$$

$$\begin{array}{r} 9 \\ + 7 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$$

108 (one hundred eight)

Relating addition and subtraction facts, sums of 16

## LESSON ACTIVITY

### Before Using the Page

- Review how many tens and how many ones there are for 15. Then ask the children what number comes after fifteen. Ask how many tens and how many ones they think there are for 16. Have them verify this by separating sixteen counters to show a group of ten and six ones. Have the children say, "Sixteen is one ten and six more." Display a flash card for the word *sixteen* and use it throughout the day to reinforce recognition of the word. Have a child show on the chalkboard how to print the numeral 16.

Have the children group together ten of their sixteen counters. Ask how many there are in each group. Develop the four related addition and subtraction sentences  $10 + 6 = 16$ ,  $6 + 10 = 16$ ,  $16 - 6 = 10$ , and  $16 - 10 = 6$ .

- Have the children take one counter from the group of ten and place it with the group of six. Ask how many there are in each group and how many there are in all. Have the children write the four related sentences for 9, 7, and 16 on the chalkboard and tell how they used their counters to illustrate each sentence.

Ask the children how they can rearrange their counters to

show two new groups. They will probably suggest moving another counter from the group of nine and placing it with the group of seven. Let them discover how many different sentences they can write for two groups of eight. Write the sentences on the chalkboard.

- Review the facts for sums of 16 by using blocks of two different colors, for example, red and blue. Display nine red blocks. Have a child select blue blocks to make 16 in all. Ask a child to identify the corresponding sentence on the chalkboard from the previous activity. Interchange the blue blocks and the red blocks, and ask a child to identify the corresponding sentence. Remove the red blocks and repeat. Replace the red blocks, remove the blue blocks, and ask a child to identify the corresponding sentence. Repeat the procedure using eight red blocks and eight blue blocks.

### Using the Page

- Direct the children's attention to the buttons at the top of the page. Ask how many red buttons there are, how many blue buttons there are, and how many buttons there are in the two groups. Then let the children work independently.

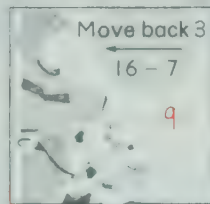
START

$$9 + 1$$

10

$$10 - 4 \quad 12 - 6 \quad 8 + 8 \quad 2 + 9$$

6      6      16      11



$$5 + 9 \quad 12 - 7 \quad 10 - 2$$

14      5      8

$$3 + 8$$

11

Move back 2



$$7 + 5 \quad 14 - 6 \quad 14 - 5 \quad 9 + 3 \quad 13 - 7$$

12      8      9      12      6

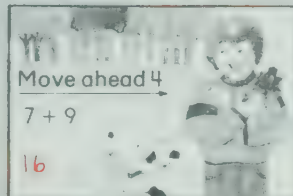


$$16 - 8$$

8

$$7 + 8 \quad 12 - 4$$

15      8



$$15 - 7 \quad 10 - 6 \quad 11 - 2 \quad 5 + 8$$

8      4      9      13

$$5 + 5$$

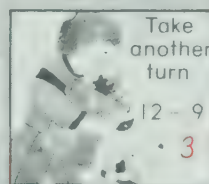
10

$$11 - 4$$

7

$$7 + 6 \quad 11 - 7 \quad 4 + 9 \quad 6 + 8 \quad 10 - 8$$

13      4      13      14      2

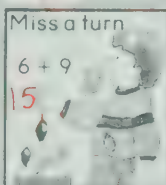


$$7 + 3 \quad 7 + 7$$

10      14

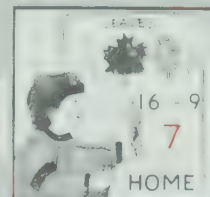
$$11 - 5$$

6



$$10 - 9 \quad 8 + 3 \quad 8 + 5 \quad 14 - 7 \quad 5 + 6$$

1      11      13      7      11



Addition and subtraction practice: sums and minuends of 10 to 16

(one hundred nine) 109

## LESSON OUTCOME

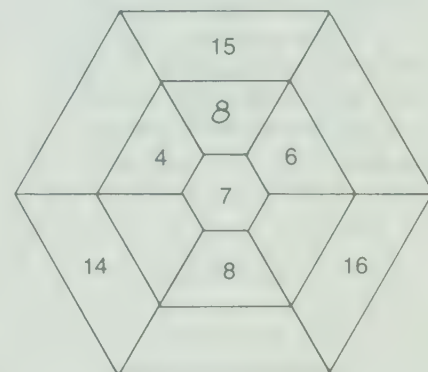
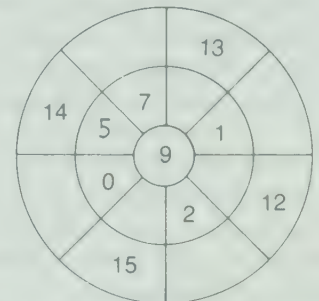
Complete basic addition and subtraction facts, sums and minuends of 10 to 16

## Materials

dice, two markers, a sheet of paper for each child

## RELATED ACTIVITIES

- Give the children copies of page T33 to complete number wheels and hexagons similar to the following.



## LESSON ACTIVITY

### Before Using the Page

- Divide the children into two teams, A and B, for a game to provide practice in addition and subtraction. Draw the following race track on the chalkboard.

|       |       |        |        |       |        |
|-------|-------|--------|--------|-------|--------|
| START | 3 + 4 | 10 - 6 | 9 + 2  | 5 + 8 | 6 + 9  |
| 9 + 5 |       |        |        |       | 4 + 7  |
| 7 + 6 |       |        |        |       | 12 - 9 |
| 8 + 8 | 7 + 2 | 16 - 9 | 14 - 8 | 7 + 8 | 8 + 2  |

Each team will need a marker. Have the first child on team A roll a die and move the marker for team A according to the number indicated on the die. Before the marker can stay in the new frame the player must add or subtract correctly the two numbers given. If not, the marker is returned to the frame it previously occupied. Then the first player of team B has a turn.

The team whose marker returns to START first is the winner. More than two teams could play this game, if you wish.

### Using the Page

- You may wish to have the children complete all the exercises on a separate sheet of paper before they play the game. This would serve as a check that the children could cope with all the exercises. The game may be used as a spare-time activity for the children. Because the game is not self-checking, you may wish to choose a leader who will check each answer from a master sheet as the game progresses.

The game is played using the same procedure as described in *Before Using the Page*. The player whose marker reaches HOME first is the winner. Before the children begin, draw attention to the special instructions (move back 3, take another turn, and so on).



## LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 17 and 18

### Vocabulary

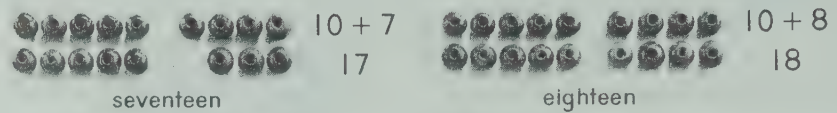
seventeen, eighteen

### Materials

eighteen counters for each child, flash cards for *seventeen* and *eighteen*

## RELATED ACTIVITIES

- Children may play a game in pairs using two dice, each marked 4, 5, 6, 7, 8, 9. The first time the game is played the children make their own game boards on a grid of nine squares. Nine of the numbers from 8 to 18 are selected and shown at random in the squares. Players take turns tossing the dice, adding the numbers shown, and placing a marker in the square for that sum (if the sum is on the game board). Before the game begins, the children decide what rule will determine a winner: the first player to have three markers in a row, column, or diagonal; the first to cover all the numbers shown on the card; the first to cover the number shown in the centre of the card.

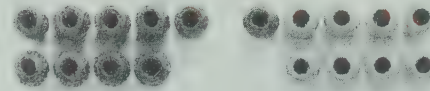


Complete the number sentences.

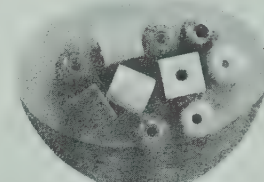


$$9 + 8 = 17$$

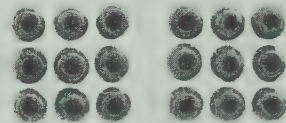
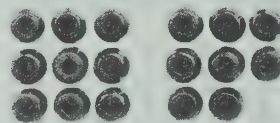
$$8 + 9 = 17$$



$$9 + 9 = 18$$



Complete.



$$17 - 8 = 9$$

$$18 - 9 = 9$$

$$17 - 9 = 8$$

$$9 + 8 = 17 \quad 8 + 9 = 17$$

$$17 - 8 = 9 \quad 17 - 9 = 8$$

$$9 + 9 = 18 \quad 18 - 9 = 9$$

|     |     |     |
|-----|-----|-----|
| 9   | 8   | 17  |
| + 8 | + 9 | - 8 |
| 17  | 17  | 9   |
| 17  | 9   | 18  |
| - 9 | + 9 | - 9 |
| 8   | 18  | 9   |

110 (one hundred ten)

Relating addition and subtraction facts, sums of 17 and 18

## LESSON ACTIVITY

### Before Using the Page

- Have the children take fifteen counters and group ten of them together. Ask how many tens and how many ones there are. Write the sentence  $15 = 10 + 5$  on the chalkboard. Have the children place one more counter in the group of ones. Ask how many there are and write  $16 = 10 + 6$ . Ask the children to include one more counter in the group of ones. Say, "Seventeen is one ten and seven more." Display a flash card for the word *seventeen*. Write the sentence  $17 = 10 + 7$  on the chalkboard. Have the children use their counters to help complete the following number sentences.

$$9 + \underline{\quad} = 17 \quad 17 - 8 = \underline{\quad}$$

$$8 + 9 = \underline{\quad} \quad 17 - \underline{\quad} = 8$$

Ask children to write their answers on the chalkboard and to tell how they used their counters to obtain the answers.

- Have the children rearrange their counters into a group of ten and seven ones again. Ask them to place one more counter in the group of ones. Say, "Eighteen is one ten and eight more." Display a flash card for the word *eighteen*. Write the sentence

$18 = 10 + 8$  on the chalkboard. Have the children use their counters to help complete the following number sentences.

$$9 + \underline{\quad} = 18 \quad 18 - 9 = \underline{\quad}$$

- Have the children extend the table described on page T133 for page 104 to include the addition combinations for the numbers from 15 to 18. You may also wish to extend the table for the subtraction combinations for minuends from 15 to 18.

| 15     | 16     | 17     | 18     |
|--------|--------|--------|--------|
| 10 + 5 | 10 + 6 | 10 + 7 | 10 + 8 |
| 9 + 6  | 9 + 7  | 9 + 8  | 9 + 9  |
| 8 + 7  |        |        |        |

### Using the Page

- Discuss the sets of beads at the top of the page to review the addition combinations of 10 and 7 for 17, and 10 and 8 for 18. Then let the children work independently.

- To reinforce that 17 is 10 and 7 more and that 18 is 10 and 8 more, have the children ring the ten orange beads for each of the first three exercises.

Add or subtract.

$$\begin{array}{r} + \\ \hline \begin{array}{|c|c|c|} \hline 4 & 5 & 9 \\ \hline 4 & 3 & 7 \\ \hline 8 & 8 & 16 \end{array} \end{array}$$

$$\begin{array}{r} + \\ \hline \begin{array}{|c|c|c|} \hline 2 & 6 & 8 \\ \hline 5 & 3 & 8 \\ \hline 7 & 9 & 16 \end{array} \end{array}$$

$$\begin{array}{r} + \\ \hline \begin{array}{|c|c|c|} \hline 3 & 6 & 9 \\ \hline 2 & 4 & 6 \\ \hline 5 & 10 & 15 \end{array} \end{array}$$

$$\begin{array}{r} + \\ \hline \begin{array}{|c|c|c|} \hline 3 & 4 & 7 \\ \hline 6 & 0 & 6 \\ \hline 9 & 4 & 13 \end{array} \end{array}$$

$$\begin{array}{r} + \\ \hline \begin{array}{|c|c|c|} \hline 2 & 7 & 9 \\ \hline 6 & 2 & 8 \\ \hline 8 & 9 & 17 \end{array} \end{array}$$

$$\begin{array}{r} + \\ \hline \begin{array}{|c|c|c|} \hline 7 & 3 & 10 \\ \hline 0 & 4 & 4 \\ \hline 7 & 7 & 14 \end{array} \end{array}$$

$$\begin{array}{r} - \\ \hline \begin{array}{|c|c|c|} \hline 14 & 6 & 8 \\ \hline 9 & 3 & 6 \\ \hline 5 & 3 & 2 \end{array} \end{array}$$

$$\begin{array}{r} - \\ \hline \begin{array}{|c|c|c|} \hline 16 & 7 & 9 \\ \hline 8 & 4 & 4 \\ \hline 8 & 3 & 5 \end{array} \end{array}$$

$$\begin{array}{r} - \\ \hline \begin{array}{|c|c|c|} \hline 15 & 9 & 6 \\ \hline 8 & 2 & 6 \\ \hline 7 & 7 & 0 \end{array} \end{array}$$

$$\begin{array}{r} - \\ \hline \begin{array}{|c|c|c|} \hline 15 & 7 & 8 \\ \hline 6 & 2 & 4 \\ \hline 9 & 5 & 4 \end{array} \end{array}$$

$$\begin{array}{r} - \\ \hline \begin{array}{|c|c|c|} \hline 18 & 9 & 9 \\ \hline 10 & 2 & 8 \\ \hline 8 & 7 & 1 \end{array} \end{array}$$

$$\begin{array}{r} - \\ \hline \begin{array}{|c|c|c|} \hline 17 & 8 & 9 \\ \hline 9 & 5 & 4 \\ \hline 8 & 3 & 5 \end{array} \end{array}$$

Addition and subtraction practice sums and minuends to 18

(one hundred eleven) III

**LESSON OUTCOME**

Complete basic addition and subtraction facts, sums and minuends to 18

**Materials**

display board, demonstration number strips, chalkboard pointers, number strips for each child (optional)

**Vocabulary**

difference, number square

**RELATED ACTIVITIES**

- The children may enjoy creating number squares of their own. This kind of activity often motivates children to explore addition combinations that have not yet been formally discussed.

**LESSON ACTIVITY****Before Using the Page**

- Prepare two large number strips, one for the numbers from 1 to 18 and one for 1 to 9. Paste each strip onto a cardboard backing. Place the 18-strip on the display board. Place the 9-strip above the 18-strip as shown.

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |  |  |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|--|--|
|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9  |    |    |    |    |    |    |    |    |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |  |  |

Using two chalkboard pointers, point to the 1 in the lower strip and the 9 in the upper strip. Ask the children, "What is the sum of 1 and 9?" After they say the answer, point to the 10 below the 9. Point to the 1 in the lower strip and the 8 in the upper strip. Ask, "What is the sum of 1 and 8?" Point to the 9 in the lower strip. Continue this procedure until the children realize that the positions of the two strips show the sums of 1 and 1, to 1 and 9.

- Leave the lower strip in its original position but place the upper strip as shown. Point to the 9 in the lower strip and the 1 in

the upper strip. Ask the children, "What is the sum of 9 and 1?" Point to the 10 in the lower strip.

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |  |  |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|--|--|
|   |   |   |   |   |   |   |   | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |    |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |  |  |

Repeat the procedure until the children realize how to use the strips to obtain the sums for 9 and 1, to 9 and 9. Then let a child become the leader.

Continue with the upper strip in other positions. You may wish to have the children write all the addition facts that can be obtained when the upper strip is in a certain position.

- To illustrate subtraction, place the 9-strip below the 18-strip so that the numbers will appear as subtraction in vertical form. By sliding the 9-strip along the 18-strip, it is possible to obtain sets of facts for each difference from 0 to 8.

**Using the Page**

- Show an addition number square and a subtraction number square on the chalkboard similar to those shown on page 111. Point out how the children can check their answers.



## LESSON OUTCOME

Use subtraction to make comparisons

## Materials

small objects for making sets

## RELATED ACTIVITIES

- You may wish to have the children discuss comparative situations that relate to themselves by asking questions such as, "How many children are there in Susan's family? How many children are there in Jim's family? Whose family has more children? How many more?"
- Have pairs of children play the game "How Many More?" described on page T163.
- Place from one to nine objects in each of nine paper bags. Label the bags A, B, C, . . . , I. Have children choose two bags, display the sets, and determine which bag has more objects. Have the children write the subtraction sentence to show how many more.

Cathy's stamps      Bob's stamps      Cathy has 9 stamps.

Bob has 12 stamps.

Who has more? Cathy (Bob)

How many more?  $12 - 9 = 3$

3 stamps

Ring to show who has more stamps.  
Show how many more.

| Cathy's stamps | Bob's stamps | How many more stamps? |
|----------------|--------------|-----------------------|
| 10             | 6            | $10 - 6 = 4$ 4        |
| 8              | 11           | $11 - 8 = 3$ 3        |
| 9              | 14           | $14 - 9 = 5$ 5        |
| 12             | 5            | $12 - 5 = 7$ 7        |
| 13             | 7            | $13 - 7 = 6$ 6        |
| 8              | 16           | $16 - 8 = 8$ 8        |
| 9              | 15           | $15 - 9 = 6$ 6        |
| 17             | 8            | $17 - 8 = 9$ 9        |
| 7              | 11           | $11 - 7 = 4$ 4        |
| 9              | 16           | $16 - 9 = 7$ 7        |
| 12             | 4            | $12 - 4 = 8$ 8        |
| 7              | 14           | $14 - 7 = 7$ 7        |
| 18             | 9            | $18 - 9 = 9$ 9        |
| 6              | 13           | $13 - 6 = 7$ 7        |

112 (one hundred twelve)      Using subtraction for making comparisons

## LESSON ACTIVITY

## Before Using the Page

- Begin with a review of the concept *how many more*. Display a set of nine objects and a set of six objects. Tell the children that the set of nine is yours. Assign the set of six to one child, say, Susan. Ask the children who has more objects, you or Susan. Have Susan match the objects in the two sets one to one. Ask the children to state how many more objects you have than Susan. Ask Susan to verify the answer given by counting the unmatched objects. Write the subtraction sentence  $9 - 6 = 3$  on the chalkboard, saying, "I have nine and Susan has six. Nine minus six equals three. I have three more objects than Susan."
- Draw this chart on the chalkboard.

| Ann | Jim | How many more? |   |
|-----|-----|----------------|---|
| 12  | 8   | $12 - 8 = 4$   | 4 |
|     |     |                |   |
|     |     |                |   |

Tell the children that Ann collected 12 shells. Have a child

write 12 in the appropriate place in the chart. Say that Jim collected 8 shells and have a child show this. Ask who collected more. Have a child draw a ring around the 12. Ask the children how they can discover how many more shells Ann collected. If the suggestion is to use counters or objects to represent the shells and match them one to one, have two children demonstrate this. Then ask for a different way to find out how many more. Lead the children to suggest the subtraction phrase  $12 - 8$ . Have one child write it in the third column. Have a child complete the subtraction sentence in the third column and also write the 4 in the last column. Say, "The difference of twelve and eight is four." Repeat the procedure for other pairs of numbers.

## Using the Page

- Word problems are presented on this page in a way that minimizes dependence on reading skills. Ask what kind of collection is shown. Read the words with the children and discuss the completed example. Have the children trace over the dotted numerals as you ask the appropriate questions. Discuss the first exercise in the chart in a similar way. Then let the children work independently.

## LESSON OUTCOME

Add and subtract amounts of money, to 18 cents

## Materials

real money, play money, or coin cutouts from copies of page T327, play store, objects marked with prices from 2¢ to 10¢

## RELATED ACTIVITIES

• After the children have completed the page, you may wish to have them imagine that they have 12¢ to spend. Ask them to determine pairs of animals they would have enough money to buy. Have them write the addition sentence for each pair.

• Prepare a store chart showing pictures of objects having prices from 1¢ to 9¢. Label the pictures A, B, C, and so on. Prepare a work sheet that indicates which pair of objects is being purchased. You may prefer to have the children indicate pairs of objects to be purchased. Have the children find the price to be paid for each purchase.

| How much do these cost? | How much do these cost? | Ring the pair that costs more. How much more? |
|-------------------------|-------------------------|---|
| 8 ¢                     | 13 ¢                    | $13 - 8 = 5$ 5 ¢                              |
| 15 ¢                    | 6 ¢                     | $15 - 6 = 9$ 9 ¢                              |
| 9 ¢                     | 17 ¢                    | $17 - 9 = 8$ 8 ¢                              |
| 14 ¢                    | 9 ¢                     | $14 - 9 = 5$ 5 ¢                              |
| 16 ¢                    | 8 ¢                     | $16 - 8 = 8$ 8 ¢                              |
| 9 ¢                     | 18 ¢                    | $18 - 9 = 9$ 9 ¢                              |
| 7 ¢                     | 12 ¢                    | $12 - 7 = 5$ 5 ¢                              |
| 11 ¢                    | 6 ¢                     | $11 - 6 = 5$ 5 ¢                              |

Adding and subtracting with money, amounts to 18 cents (one hundred thirteen) 113

## LESSON ACTIVITY

## Before Using the Page

- Display 12 pennies and ask how much money there is. Have a child use a dime and pennies to show a set of coins worth 12 cents. Review the fact that a dime has a value equivalent to ten pennies. Repeat the procedure for other sets of pennies (values to 18 cents).
- Display a chart that shows sets of pennies with values to 18 cents in one column and sets of coins that show a dime and up to 8 pennies in another column. Have the children draw lines from one column to the other to match equal amounts of money.
- Give each child one dime and nine pennies. Display objects in the play store marked with prices from 2¢ to 10¢. Let the children select two objects to buy and have them pay for the objects using the correct amount of money.

Have prepared a large chart with columns similar to the ones shown on page 113. Help each child to show her/his purchases in the "How much?" columns together with words or pictures to show what was bought. After all the purchases have been made, compare the pairs of purchases in each row and have

children ring the pair of objects that costs more than the other. Ask how they could determine how much more that pair costs. Lead the children to suggest a subtraction sentence. Write this in the "How much more?" column and write the difference in the last column.

Note that this activity requires the children to recall the basic addition facts from memory, whereas subtraction sentences are written for comparing the two numbers.

## Using the Page

- Have the children identify animals pictured at the top of the page and the price associated with each. Discuss the first row of the chart. Start the second row with the children and then let them work independently. Children may find it easier to complete the exercises if they write the price of each animal first beside the animals for each exercise.



## LESSON OUTCOME

Recognize one-fourth of a whole; use the symbol  $\frac{1}{4}$

### Materials

objects to be cut into fourths (apples, sandwiches, ribbon, paper strips), display board and cutouts for showing fourths, square, rectangular, and circular pieces of paper, scissors

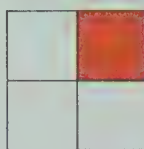
### Vocabulary

one-fourth, fourths

## RELATED ACTIVITIES

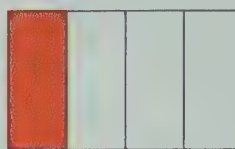
- Help the children to discover several ways of dividing a square piece of paper into fourths. Have them color one fourth and write  $\frac{1}{4}$  on one of the fourths.

1 red part  
4 equal parts

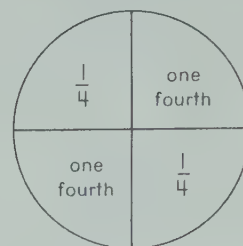


$\frac{1}{4}$  is red.

1 red part  
4 equal parts

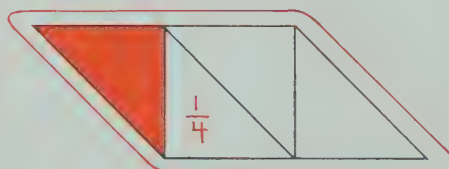
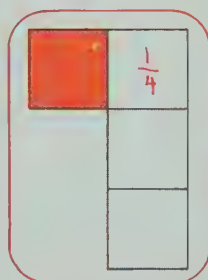
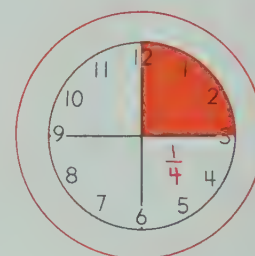
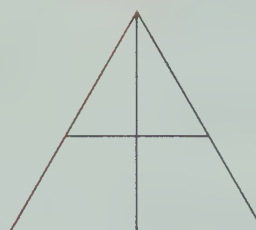
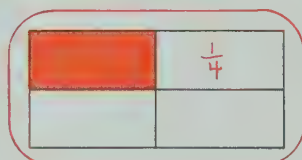
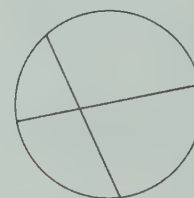
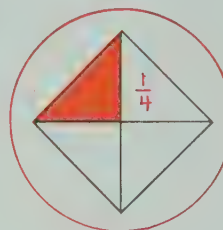
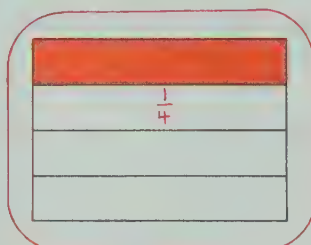


$\frac{1}{4}$  is red.



Ring each picture that shows fourths.

Color one fourth. Print  $\frac{1}{4}$  on one fourth.



114 (one hundred fourteen)

Introduction to the symbol  $\frac{1}{4}$

## LESSON ACTIVITY

### Before Using the Page

- Relating parts of a whole to the concept of “a fair share” helps children to realize that the parts must be equal.

Display an apple and tell the children that four of them are to share it. Have the children suggest how you should cut the apple so that each child will get a fair share. After the first cut of the apple is made, review halves, the term *one-half*, and the symbol  $\frac{1}{2}$ . Cut each half of the apple into halves. Discuss the fact that there are four equal parts and that each part is called *one-fourth*.

Repeat the procedure of sharing an object among four children. Have them help to show how the cuts should be made for sharing each object.

- Distribute string, ribbon, or paper strips of various lengths and have children determine how they would share one piece among four of them. They will likely do this by folding the ribbon and then folding again and cutting it.
- Give the children square, rectangular, and circular pieces of paper. Have them determine how to fold each piece into four equal parts. Ask if the four parts are equal and what each part is

called. You may wish to have the children cut the shapes along the fold lines to obtain the four equal parts, or you may prefer to have them color one fourth.

- Cut several shapes into fourths. Place one fourth of each shape on the display board. Have the children find the remaining three fourths of each shape. Have them match fourths by placing one piece on top of another. Then have them use the fourths to complete the shapes. Discuss the shapes.

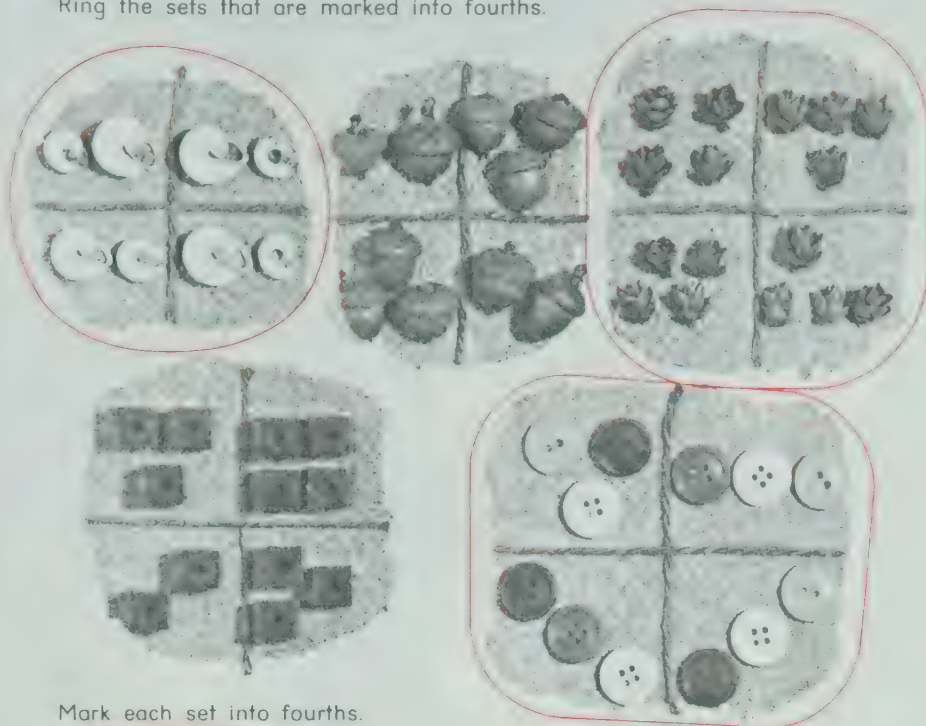


- Show the children how to write the symbol  $\frac{1}{4}$ . Explain that the symbol indicates one part of an object that has been divided into four equal parts. Have the children practise writing the symbol  $\frac{1}{4}$ .

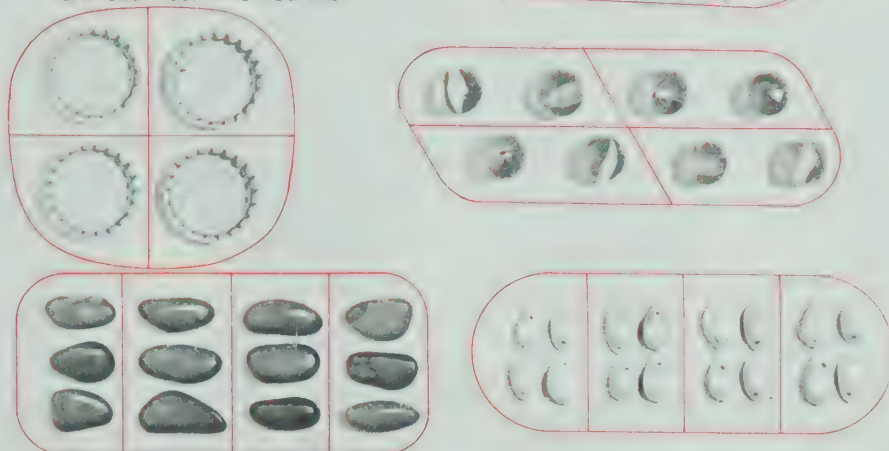
### Using the Page

- Read the words at the top of the page to the children and discuss the words in relation to the diagrams. Complete the first exercise with the children and then let them work independently.

Ring the sets that are marked into fourths.



Mark each set into fourths.



Identifying one-fourth of a set

(one hundred fifteen) 115

## LESSON OUTCOME

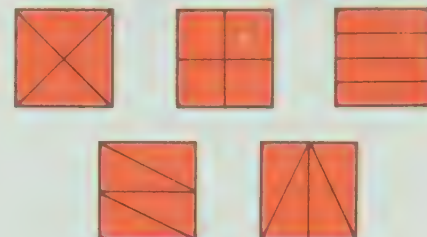
Identify one-fourth of a set

### Materials

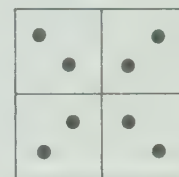
display board and cutouts, yarn

### RELATED ACTIVITIES

- Square sheets of colored paper about 24 cm by 24 cm may be prepared in advance, showing lines that mark each sheet into four equal parts as shown.



You may use both sides of each sheet and include sheets marked into halves, as well. Ask the children to hold up a sheet that shows fourths and then a sheet that shows halves. Then ask them to take eight small objects and place them on a sheet to show fourths of eight. Give similar instructions for other examples of halves and fourths.



## LESSON ACTIVITY

### Before Using the Page

- Discuss some of the activities from the previous page for a review of the term *one-fourth* and the symbol  $\frac{1}{4}$ .
- Use yarn to mark the display board into two regions. Use more yarn to mark one of the regions into four regions. Ask a child to place eight cutouts in the large region, counting aloud as they are placed. Now say that the cutouts are to be shared among four children so that each has an equal share. Have a child move the cutouts into the four smaller regions on the display board. Ask how many parts there are (four), how many cutouts there are in each part (two), and what name is given to each part (one fourth). Remind the children that they began with eight and tell them that one-fourth of eight is two.
- Remove the yarn and the cutouts from the display board. Place four of the cutouts in a two-by-two array on the display board. Ask how many cutouts there are. Have a child use two pieces of yarn to partition the set into fourths.

Repeat for other numbers of cutouts (multiples of four) to 20. Each time, ask, "What is one-fourth of (the number)?"

- Place ten cutouts on the display board. Use pieces of yarn to partition the cutouts into three groups of three and one more. Ask the children if the arrangement shows fourths and have them discuss why not. Repeat for several other examples.

### Using the Page

- Read the instruction at the top of the page. For the first exercise, ask the following questions: "How many shells are there altogether? How many parts are there? How many shells are there in each part? Does this picture show fourths? What is one-fourth of eight?"

Read the instruction for the second part of the page and discuss what the children are to do. Then let them complete the page on their own.



## LESSON OUTCOME

Tell time in quarter hours

### Materials

a circular piece of paper and a larger sheet of paper for each child, paste, real clock, demonstration clock face, paper-plate clock face for each child

### RELATED ACTIVITIES

- Children may play the game “Time Will Tell” described on page T163.

Ring the time shown.

116 (one hundred sixteen)

Telling time in quarter hours

## LESSON ACTIVITY

### Before Using the Page

- Give each child a circular piece of paper. Have them fold the paper in half vertically and then fold it horizontally to obtain fourths. Have the children unfold the papers and state how many parts there are, whether the parts are equal, and what each part is called. Ask the children what numerals on a clock face would appear at the ends of the fold lines. Have them write the four numerals (3, 6, 9, 12) on the paper and then the remaining numerals. Have them paste the clock faces on a larger sheet of paper and use a straight edge to draw over the fold lines.

Have the children count orally by fives to 60. Show them how to place the numerals 5 to 60 around the edge of the circular paper.

- Have children use their paper-plate clock faces prepared for page 78 while you use a real clock or a demonstration clock face. Review how the hour hand moves as the minute hand moves. Start at 3:00 and move to 3:30. Have children state what time is shown. Ask how far round the clock face the long hand moved from 12 as the time changed from 3:00 to 3:30. Have the

children refer to the clock faces prepared in the first activity. Have them start at 12 and trace half way round the clock face. Ask what number they reach if counting by fives.

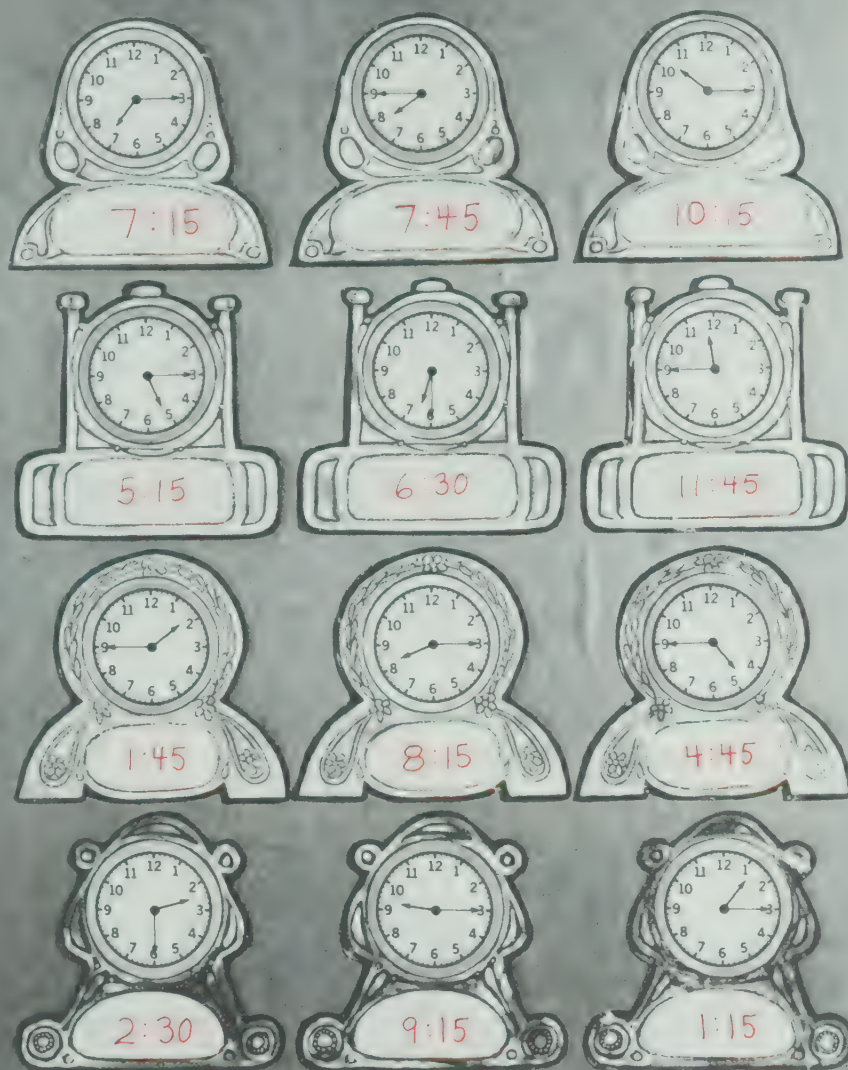
- Start at 9:00 with the real clock and move the hands to show 9:15. Ask how far round the clock face the long hand moved (one-fourth). Have the children start at 12, trace one-fourth of the distance with their fingers, and tell what number they reach. Say that this time is called “nine fifteen”. Have a child verify this by counting by fives from the 1. Repeat for other times. Then use the same procedure to introduce times such as 2:45, 5:45, and so on. Have the children read times shown on the real clock and show times on their paper-plate clock faces.

Discuss the fact that as the long hand moves one-fourth of the distance round the clock face, the short hand moves one-fourth of the distance between two numerals.

### Using the Page

- Have the children draw the long and the short hands to show 3:00 on the first clock face at the top of the page. Discuss the times shown on the other three clock faces. Then have the children ring the time shown on each clock face.





Telling time in quarter hours

(one hundred seventeen) 117

**LESSON OUTCOME**

Record time in quarter hours

**Materials**

real clock, flash cards showing times (optional), a paper-plate clock face for each child

**RELATED ACTIVITIES**

• Children may play the following game for two to four players. You will need a game board like the one shown on page T163, a marker for each player, one card marked with 12:00, and two cards marked with each of the eleven other times shown on the game board.

The time cards are placed face down in a pile in the centre of the game board. Players begin by placing their markers at 12:00. They take turns drawing the time card from the top of the pile and moving clockwise to the clock face that shows the time indicated on the card. For example, if a player's marker is at 7:30 and the time card drawn shows 3:00, the marker would be moved clockwise to the clock face showing three o'clock. Each time a player's marker passes twelve o'clock one point is scored. The player with the most points is the winner. The end of the game may be determined by setting an alarm clock to ring at a certain time after the game starts. If you prefer, the game may end after all the time cards have been drawn once.

**LESSON ACTIVITY****Before Using the Page**

- Review counting by fives to 60 using the numerals on a clock face.
- Move the hands on a real clock to show four o'clock. Ask what time is shown. Have a child write the time on the chalkboard (4:00). Ask children to state where the long hand and the short hand are pointing. Move the hands of the clock to show 4:15 and repeat the procedure. Repeat for 4:30, 4:45, and 5:00. Review the fact that for times that are 15 minutes past the hour, the long hand always points to the 3, and for 45 minutes past the hour the long hand always points to the 9.
- Show times, to half hours and to quarter hours, on the real clock and have children tell what time is shown.
- Write times, to the half hour and to the quarter hour, on the chalkboard or use flash cards showing times. Have children show these times on their paper-plate clock faces. Ask them to hold up the clock faces to enable you to check their work.
- Relate times to specific activities that take place during the day. For example, "At 10:30 we go out for recess. At 10:45

recess is over. At 11:15 we have our reading groups. At 12:00 we have lunch. At 3:30 we go home."

**Using the Page**

- Discuss the time shown on the first clock face. Ask what number the short hand has just passed. Have the children print the numeral 7 for the hour and then a colon to the right of the 7. Then ask where the long hand points, how far round the clock face it has moved, and what number is reached if counting by fives. Have the children print 15 to complete the numeral for the time. Ask several children to read the numeral. Then let the children work independently. You may wish to have the children color parts of the clock faces. For the first clock face, for example, they would color one-fourth of the face; for the second clock face, they would color three-fourths of the face.



## OBJECTIVE




Demonstrate an understanding of two-place numerals

## Materials

objects for grouping by tens, an abacus chart for each child

## RELATED ACTIVITIES

- Prepare a work sheet, as shown, on which the children draw groups of tens and ones to complete each picture.

|   |    |
|---|----|
|  | 23 |
|  | 15 |
|  | 47 |

- Children may practise writing two-place numerals using two dice marked 2, 4, 6, 7, 8, 9 and 0, 1, 3, 5, 7, 9. The dice are rolled and then placed to form a two-place numeral (two numerals are possible for each roll). Then the child writes the standard numeral and shows the number using tens and ones.

- For frequent quick reviews of two-place numerals, use models of tens and ones such as Base Ten Blocks on the overhead projector. Mark a sheet of acetate into two columns with the headings "tens" and "ones". Show appropriate models for several numbers and have children write the corresponding numerals.



2 tens 3 ones 23



3 tens 2 ones 32

Match.

4 tens 6 ones 25  
1 ten 7 ones 38  
8 tens 3 ones 46  
2 tens 5 ones 83  
3 tens 8 ones 17  
6 tens 0 ones 52  
5 tens 2 ones 73  
4 tens 8 ones 60  
3 tens 7 ones 84  
9 tens 9 ones 37  
7 tens 3 ones 99  
8 tens 4 ones 48

Complete.

34 = 3 tens 4 ones

43 = 4 tens 3 ones

55 = 5 tens 5 ones

65 = 6 tens 5 ones

29 = 2 tens 9 ones

92 = 9 tens 2 ones

70 = 7 tens 0 ones

80 = 8 tens 0 ones

3 tens 6 ones = 36

4 tens 0 ones = 40

7 tens 8 ones = 78



118 (one hundred eighteen)

Understanding two-place numerals

## LESSON ACTIVITY

### Before Using the Page

- Review counting by tens from 10 to 100. Then review the concept of tens and ones for numbers to 99.
- Have the children use the objects for grouping by tens and their abacus charts. (See page T75.) Ask children to take 23 ones and make groups of ten. Ask how many tens and how many ones there are. Have a child write the numeral 23 on the chalkboard. Use the child's numeral to complete the following sentence: 23 = 2 tens 3 ones.

Have a child write the numeral 48 on the chalkboard. Ask how many tens and how many ones there would be for 48. Have the children demonstrate this with the objects. Then write the sentence 48 = 4 tens and 8 ones. Repeat the procedure for different numbers to 99. Ask children to choose some numbers to be represented by tens and ones.

- Have a child choose a number that is less than 100. Ask another child to use the objects for grouping to show the groups of ten for the number. Have another child show the ones needed

to represent the number. A fourth child may complete the sentence: \_\_\_\_\_ = \_\_\_\_\_ tens \_\_\_\_\_ ones.

- Display some tens and some ones. Have children determine what number is represented. Ask a child to write the two-place numeral on the chalkboard. Repeat several times.
- Write sentences similar to the following on the chalkboard. Have the children complete the sentences.

37 = \_\_\_\_\_ tens \_\_\_\_\_ ones

75 = \_\_\_\_\_ tens \_\_\_\_\_ ones

73 = \_\_\_\_\_ tens \_\_\_\_\_ ones

80 = \_\_\_\_\_ tens \_\_\_\_\_ ones

### Using the Page

- Discuss the two examples at the top of the page. Direct the children's attention to the two number names that are matched in the column at the left. Make sure the children understand that they are to match equivalent forms for the same number.

For the exercises in the column at the right, each two-place numeral is to be interpreted as a number of tens and ones.

# LESSON OUTCOME

Add multiples of ten, sums to 90

## Materials

objects for grouping by tens, an abacus chart for each child

## RELATED ACTIVITIES

- Have the children complete an addition table for multiples of ten.

| +  | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|----|----|----|----|----|----|----|----|----|
| 10 |    |    |    |    |    |    |    |    |
| 20 |    |    |    |    |    |    |    |    |
| 30 |    |    |    |    |    |    |    |    |
| 40 |    |    |    |    |    |    |    |    |

- Have the children work alone or with a partner using nine groups of ten. One child places some groups of ten on an abacus chart and writes the numeral on paper. The partner places more groups of ten on the chart and writes the numeral below the first numeral. One child writes the sum on the paper and the other child checks the answer by counting the groups of ten.

- Prepare a work sheet as shown. Children will discover the relationship between addition facts having sums to 9 and multiples of ten having sums to 90.

Find the pattern.

|     |      |     |      |
|-----|------|-----|------|
| 2   | 20   | 3   | 30   |
| + 3 | + 30 | + 4 | + 40 |

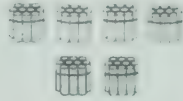


$$\begin{array}{r} 3 \text{ tens } 0 \text{ ones} \\ + 2 \text{ tens } 0 \text{ ones} \\ \hline 5 \text{ tens } 0 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 3    | 0    |
| + 2  | 0    |
| 5    | 0    |

$$\begin{array}{r} 30 \\ + 20 \\ \hline 50 \end{array}$$

Complete.



$$\begin{array}{r} 4 \text{ tens } 0 \text{ ones} \\ + 2 \text{ tens } 0 \text{ ones} \\ \hline \end{array}$$

$$\underline{6} \text{ tens } \underline{0} \text{ ones}$$

| tens | ones |
|------|------|
| 4    | 0    |
| + 2  | 0    |
| 6    | 0    |

$$\begin{array}{r} 40 \\ + 20 \\ \hline \end{array}$$

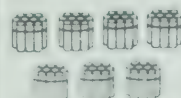
$$\underline{60}$$



| tens | ones |
|------|------|
| 2    | 0    |
| + 1  | 0    |
| 3    | 0    |

$$\begin{array}{r} 20 \\ + 10 \\ \hline \end{array}$$

$$\underline{30}$$



| tens | ones |
|------|------|
| 4    | 0    |
| + 3  | 0    |
| 7    | 0    |

$$\begin{array}{r} 40 \\ + 30 \\ \hline \end{array}$$

$$\underline{70}$$

| tens | ones |
|------|------|
| 6    | 0    |
| + 2  | 0    |
| 8    | 0    |

$$\begin{array}{r} 60 \\ + 20 \\ \hline \end{array}$$

$$\underline{80}$$

| tens | ones |
|------|------|
| 2    | 0    |
| + 5  | 0    |
| 7    | 0    |

$$\begin{array}{r} 20 \\ + 50 \\ \hline \end{array}$$

$$\underline{70}$$

Add.

$$\begin{array}{r} 30 \\ + 30 \\ \hline \end{array}$$

$$\underline{60}$$

$$\begin{array}{r} 40 \\ + 10 \\ \hline \end{array}$$

$$\underline{50}$$

$$\begin{array}{r} 50 \\ + 40 \\ \hline \end{array}$$

$$\underline{90}$$

$$\begin{array}{r} 10 \\ + 80 \\ \hline \end{array}$$

$$\underline{90}$$

$$\begin{array}{r} 70 \\ + 20 \\ \hline \end{array}$$

$$\underline{90}$$

$$\begin{array}{r} 10 \\ + 10 \\ \hline \end{array}$$

$$\underline{20}$$

$$\begin{array}{r} 20 \\ + 40 \\ \hline \end{array}$$

$$\underline{60}$$

$$\begin{array}{r} 50 \\ + 20 \\ \hline \end{array}$$

$$\underline{70}$$

$$\begin{array}{r} 30 \\ + 50 \\ \hline \end{array}$$

$$\underline{80}$$

$$\begin{array}{r} 20 \\ + 30 \\ \hline \end{array}$$

$$\underline{50}$$

$$\begin{array}{r} 20 \\ + 20 \\ \hline \end{array}$$

$$\underline{40}$$

$$\begin{array}{r} 60 \\ + 30 \\ \hline \end{array}$$

$$\underline{90}$$

$$\begin{array}{r} 50 \\ + 30 \\ \hline \end{array}$$

$$\underline{80}$$

$$\begin{array}{r} 40 \\ + 40 \\ \hline \end{array}$$

$$\underline{80}$$

$$\begin{array}{r} 30 \\ + 40 \\ \hline \end{array}$$

$$\underline{70}$$

$$\begin{array}{r} 20 \\ + 70 \\ \hline \end{array}$$

$$\underline{90}$$

$$\begin{array}{r} 10 \\ + 60 \\ \hline \end{array}$$

$$\underline{70}$$

$$\begin{array}{r} 40 \\ + 50 \\ \hline \end{array}$$

$$\underline{90}$$

Adding multiples of ten, sums to 90

(one hundred nineteen) 119

## LESSON ACTIVITY

### Before Using the Page

- Have the children count by tens to 100. Have them use their abacus charts in the way described on page T152 and objects for grouping to represent the number 10. Ask how many tens and how many ones there are and show this on the chalkboard. Proceed in a similar manner for the multiples of ten from 20 to 90.
- Display 4 tens and 0 ones. Ask what number is represented. Repeat for other numbers of tens and zero ones.
- Write the numeral 20 on the chalkboard. Ask how many tens and how many ones are represented and have a child demonstrate by grouping objects. Then write the digits in the tens' and ones' columns as shown. Write the numeral 40 below the 20 as shown and repeat the procedure.

| tens | ones |      |
|------|------|------|
| 2    | 0    | 20   |
| + 4  | 0    | + 40 |
| 6    | 0    | 60   |

Have a child join the two sets of tens and ones and state how many of each there are. Write the sum as shown. Include the symbol + as you ask the children, "What is the sum of 20 and 40?"

Repeat the procedure for other pairs of multiples of ten (sums to 90) until the children understand the method. Lead them to realize that they can find the total number of tens and ones by adding the numbers in columns.

### Using the Page

- Discuss the completed exercise with the children by asking the following questions: "How many tens and how many ones are there in the first row? What number is this? How many more tens and ones are there? What number is this? What is the sum of 30 and 20? How many ones are there? How many tens are there?"

Have the children complete the second exercise as you ask questions similar to those suggested above. Remind them to write the 0 in the ones' column each time. Then let the children work independently.



LESSON OUTCOME

Add multiples of ten to 90, and ones

Materials


objects for grouping by tens, an abacus chart for each child


RELATED ACTIVITIES

- Have the children complete a table like the one shown below.

| +  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----|---|---|---|---|---|---|---|---|---|
| 10 |   |   |   |   |   |   |   |   |   |
| 20 |   |   |   |   |   |   |   |   |   |
| 30 |   |   |   |   |   |   |   |   |   |
| 40 |   |   |   |   |   |   |   |   |   |
| 50 |   |   |   |   |   |   |   |   |   |
| 60 |   |   |   |   |   |   |   |   |   |
| 70 |   |   |   |   |   |   |   |   |   |
| 80 |   |   |   |   |   |   |   |   |   |
| 90 |   |   |   |   |   |   |   |   |   |

- A work sheet for reviewing different ways of representing a number (using objects for grouping, showing the number of tens and the number of ones, writing expanded notation, writing the standard numeral) can be used.

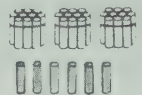
  
$$\begin{array}{r} 3 \\ 30 \\ \hline \end{array} + \begin{array}{r} 2 \\ 2 \\ \hline \end{array} = 32$$

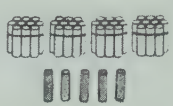

$$\begin{array}{r} 2 \text{ tens } 0 \text{ ones} \\ + \quad \quad 4 \text{ ones} \\ \hline 2 \text{ tens } 4 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 2    | 0    |
| +    | 4    |
| 2    | 4    |

$$\begin{array}{r} 20 \\ + 4 \\ \hline 24 \end{array}$$

Complete.


$$\begin{array}{r} 30 \\ + 6 \\ \hline 36 \end{array}$$


$$\begin{array}{r} 40 \\ + 5 \\ \hline 45 \end{array}$$

| tens | ones |
|------|------|
| 6    | 0    |
| +    | 8    |
| 6    | 8    |

$$\begin{array}{r} 60 \\ + 8 \\ \hline 68 \end{array}$$

| tens | ones |
|------|------|
| 1    | 0    |
| +    | 7    |
| 1    | 7    |

$$\begin{array}{r} 10 \\ + 7 \\ \hline 17 \end{array}$$

|     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|
| 70  | 90  | 80  | 50  | 10  | 60  |
| + 6 | + 3 | + 9 | + 2 | + 9 | + 4 |
| 76  | 93  | 89  | 52  | 19  | 64  |

|     |      |     |      |     |      |
|-----|------|-----|------|-----|------|
| 90  | 5    | 60  | 4    | 20  | 3    |
| + 2 | + 70 | + 1 | + 40 | + 7 | + 80 |
| 92  | 75   | 61  | 44   | 27  | 83   |

|             |             |             |
|-------------|-------------|-------------|
| 20 + 6 = 26 | 40 + 7 = 47 | 50 + 4 = 54 |
| 30 + 5 = 35 | 10 + 2 = 12 | 60 + 7 = 67 |
| 70 + 1 = 71 | 50 + 8 = 58 | 20 + 2 = 22 |
| 80 + 3 = 83 | 90 + 9 = 99 | 80 + 5 = 85 |
| 60 + 9 = 69 | 30 + 3 = 33 | 70 + 8 = 78 |

120 (one hundred twenty)

Adding multiples of ten, and ones

LESSON ACTIVITY

Before Using the Page

- Review the procedure for finding the sum of two multiples of ten having sums to 90. Then relate procedures for finding the sums of basic facts and the sums of multiples of ten.
- Ask a child to think of a number that is less than 100 and to write it on the chalkboard. Have one child display the groups of ten and another child display the ones for the number. If the number is 53, for example, write sentences as shown below and then repeat the procedure for other numbers.  
$$53 = 5 \text{ tens } 3 \text{ ones}$$
$$53 = 50 + 3$$
- Follow the procedure suggested for the third activity in *Before Using the Page* on page T153, to show how to find the sum of a multiple of ten and a number less than ten.

Repeat the procedure for other pairs of numbers, eventually eliminating the step of writing the tens and ones separately as shown, but emphasizing the position of the second numeral in the one's column. When considering the sum, have the children write the number of ones first and then the number of tens.

|     | tens | ones |
|-----|------|------|
| 30  | 3    | 0    |
| + 6 |      | 6    |
| 36  | 3    | 6    |

- Have the children work alone or with a partner using nine groups of ten and nine ones on an abacus chart. One child places some groups of ten on the abacus chart and writes the numeral on paper. The partner places some ones on the chart and writes the numeral below the first numeral. To ensure that the children write the second numeral in the ones' column, you may wish to prepare a work sheet showing charts for tens and ones.

Using the Page

- If you feel that the children are ready to proceed on the page without preliminary discussion, let them do so. Otherwise, discuss the completed exercise, asking questions such as: "How many tens and how many ones are there in the first row? What number is this? How many more tens and ones are there? What number is this? How many ones are there in all? How many tens are there in all? What is the sum of 20 and 4?"

## LESSON OUTCOME

Add two-digit numbers and one-digit numbers, no regrouping, sums to 99

## Materials

objects for grouping by tens, an abacus chart for each child

## Vocabulary

digit

## RELATED ACTIVITIES


- You may wish to have the children extend each sequence at the bottom of the page by writing addition sentences to complete the sequence of ten sentences. (Use copies of the charts on page T332.)
- You may wish to have the children practise writing two-place numerals in expanded form.

$$47 = \underline{\quad} + \underline{\quad}$$

$$25 = \underline{\quad} + \underline{\quad}$$

$$36 = \underline{\quad} + \underline{\quad}$$

$$89 = \underline{\quad} + \underline{\quad}$$




$$\begin{array}{r} 2 \text{ tens } 3 \text{ ones} \\ + \quad \quad 4 \text{ ones} \\ \hline 2 \text{ tens } 7 \text{ ones} \end{array}$$

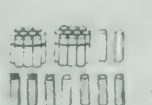
| tens | ones |
|------|------|
| 2    | 3    |
| +    | 4    |
| 2    | 7    |

$$\begin{array}{r} 23 \\ + 4 \\ \hline 27 \end{array}$$

Complete.



$$\begin{array}{r} 33 \\ + 3 \\ \hline 36 \end{array}$$



$$\begin{array}{r} 22 \\ + 7 \\ \hline 29 \end{array}$$

| tens | ones |
|------|------|
| 4    | 1    |
| +    | 8    |
| 4    | 9    |

$$\begin{array}{r} 41 \\ + 8 \\ \hline 49 \end{array}$$

| tens | ones |
|------|------|
|      | 6    |
| +    | 3    |
| 5    | 9    |

$$\begin{array}{r} 6 \\ + 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 46 \\ + 1 \\ \hline 47 \end{array}$$

$$\begin{array}{r} 82 \\ + 5 \\ \hline 87 \end{array}$$

$$\begin{array}{r} 67 \\ + 2 \\ \hline 69 \end{array}$$

$$\begin{array}{r} 4 \\ + 73 \\ \hline 77 \end{array}$$

$$\begin{array}{r} 91 \\ + 5 \\ \hline 96 \end{array}$$

$$\begin{array}{r} 63 \\ + 3 \\ \hline 66 \end{array}$$

$$\begin{array}{r} 56 \\ + 3 \\ \hline 59 \end{array}$$

$$\begin{array}{r} 57 \\ + 2 \\ \hline 59 \end{array}$$

$$\begin{array}{r} 58 \\ + 1 \\ \hline 59 \end{array}$$

$$\begin{array}{r} 72 \\ + 5 \\ \hline 77 \end{array}$$

$$\begin{array}{r} 62 \\ + 4 \\ \hline 66 \end{array}$$

$$\begin{array}{r} 2 \\ + 53 \\ \hline 55 \end{array}$$

$$3 + 2 = \underline{5}$$

$$5 + 4 = \underline{9}$$

$$12 + 6 = \underline{18}$$

$$13 + 2 = \underline{15}$$

$$25 + 4 = \underline{29}$$

$$32 + 6 = \underline{38}$$

$$23 + 2 = \underline{25}$$

$$45 + 4 = \underline{49}$$

$$52 + 6 = \underline{58}$$

$$33 + 2 = \underline{35}$$

$$65 + 4 = \underline{69}$$

$$72 + 6 = \underline{78}$$

$$43 + 2 = \underline{45}$$

$$85 + 4 = \underline{89}$$

$$92 + 6 = \underline{98}$$

Adding two-digit and one-digit numbers, no regrouping

(one hundred twenty-one) 121

## LESSON ACTIVITY

## Before Using the Page

• Begin by having the children review the work of the previous three pages. Write exercises on the chalkboard similar to those on the pages and have children write the answers on the chalkboard.

• Write 24 and 3 in vertical form on the chalkboard. Have one child display tens and ones for 24. Write the number of tens and the number of ones in a chart. Have another child display three ones in a separate group. Write the number of ones in the chart. Have another child join the two groups and state how many tens and how many ones there are. Have the children say, "Two tens four ones and three more ones are two tens seven ones." Ask what number this is and write it on the chalkboard. Have the children say, "Twenty-four plus three equals twenty-seven."

Repeat the procedure for other pairs of similar numbers (no regrouping) and gradually lead the children to see that they may "think" the step of tens and ones, rather than write it, and then perform the vertical addition.

• Have children work alone or with a partner using nine groups of ten and nine ones on an abacus chart. One child places some groups of ten and ones on the chart and writes the numeral on paper. The partner places more ones on the chart and writes the numeral below the first numeral and in the ones' column. One child writes the sum on the paper and the other checks the answer by joining the two sets and counting the groups of ten and the ones.

• Copy the table at the right on the chalkboard. Have the children write the sums 7, 17, 27, and so on. Discuss the pattern for the numbers. You may wish to have the children make up other tables similar to this one. For example,  $2 + 6$ ,  $12 + 6$ , and so on, or  $4 + 5$ ,  $14 + 5$ , and so on.

## Using the Page

• Follow the same procedure that you used for page 120.

|    |   |
|----|---|
| +  | 3 |
| 4  |   |
| 14 |   |
| 24 |   |
| 34 |   |
| 44 |   |
| 54 |   |
| 64 |   |
| 74 |   |
| 84 |   |
| 94 |   |



# LESSON OUTCOME

Add two-digit numbers and multiples of ten, sums to 99

## Materials

objects for grouping by tens, an abacus chart for each child

## RELATED ACTIVITIES

• Give remedial help to those children who are having difficulty. It may be necessary to spend some time improving the ability to recall addition facts having sums to 9. Then, to ease the transition from the use of concrete materials to the abstract addition of numbers, have the children mark tallies in columns of tens and ones to represent the numbers. For example, to find the sum of 25 and 40, the children will represent each number as tens and ones, mark tallies on a chart, find how many tallies there are on the chart for ones and for tens, and work back to show the number of ones and the number of tens. Finally, they will show the standard numeral for the sum.

$$\begin{array}{r} 225 \\ + 40 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \text{ tens } 5 \text{ ones} \\ + 4 \text{ tens } 0 \text{ ones} \\ \hline \end{array}$$

| tens | ones |
|------|------|
|      |      |
|      |      |
|      |      |



$$\begin{array}{r} 3 \text{ tens } 4 \text{ ones} \\ + 2 \text{ tens } 0 \text{ ones} \\ \hline 5 \text{ tens } 4 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 3    | 4    |
| + 2  | 0    |
| 5    | 4    |

$$\begin{array}{r} 34 \\ + 20 \\ \hline 54 \end{array}$$

Complete.



| tens | ones |
|------|------|
| 2    | 3    |
| + 1  | 0    |
| 3    | 3    |

$$\begin{array}{r} 23 \\ + 10 \\ \hline 33 \end{array}$$



| tens | ones |
|------|------|
| 1    | 5    |
| + 3  | 0    |
| 4    | 5    |

$$\begin{array}{r} 15 \\ + 30 \\ \hline 45 \end{array}$$

| tens | ones |
|------|------|
| 2    | 0    |
| + 2  | 7    |
| 4    | 7    |

$$\begin{array}{r} 20 \\ + 27 \\ \hline 47 \end{array}$$

| tens | ones |
|------|------|
| 3    | 0    |
| + 3  | 9    |
| 6    | 9    |

$$\begin{array}{r} 30 \\ + 39 \\ \hline 69 \end{array}$$

$$\begin{array}{r} 56 \\ + 10 \\ \hline 66 \end{array}$$

$$\begin{array}{r} 74 \\ + 20 \\ \hline 94 \end{array}$$

$$\begin{array}{r} 58 \\ + 30 \\ \hline 88 \end{array}$$

$$\begin{array}{r} 85 \\ + 10 \\ \hline 95 \end{array}$$

$$\begin{array}{r} 21 \\ + 60 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 70 \\ + 16 \\ \hline 86 \end{array}$$

$$\begin{array}{r} 30 \\ + 53 \\ \hline 83 \end{array}$$

$$\begin{array}{r} 18 \\ + 60 \\ \hline 78 \end{array}$$

$$\begin{array}{r} 49 \\ + 30 \\ \hline 79 \end{array}$$

$$\begin{array}{r} 30 \\ + 62 \\ \hline 92 \end{array}$$

$$\begin{array}{r} 27 \\ + 70 \\ \hline 97 \end{array}$$

$$\begin{array}{r} 10 \\ + 81 \\ \hline 91 \end{array}$$

$$\begin{array}{r} 32 \\ + 10 \\ \hline 42 \end{array}$$

$$\begin{array}{r} 32 \\ + 20 \\ \hline 52 \end{array}$$

$$\begin{array}{r} 32 \\ + 30 \\ \hline 62 \end{array}$$

$$\begin{array}{r} 32 \\ + 40 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 32 \\ + 50 \\ \hline 82 \end{array}$$

$$\begin{array}{r} 32 \\ + 60 \\ \hline 92 \end{array}$$

$$\begin{array}{r} 30 \text{ } \textcircled{\cdot\cdot} \text{'s} \\ 26 \text{ } \textcircled{\cdot\cdot} \text{'s} \\ \hline 56 \text{ } \textcircled{\cdot\cdot} \text{'s in all} \end{array}$$

$$\begin{array}{r} 25 \text{ } \textcircled{\cdot\cdot\cdot} \text{'s} \\ 40 \text{ } \textcircled{\cdot\cdot\cdot} \text{'s} \\ \hline 65 \text{ } \textcircled{\cdot\cdot\cdot} \text{'s in all} \end{array}$$

122 (one hundred twenty-two)

Adding two-digit numbers and multiples of ten

## LESSON ACTIVITY

### Before Using the Page

- Begin with an oral or a written review using addition exercises similar to the types shown on pages 119, 120, and 121. When each sum is discussed, have the children state the addends for that sum.
- Write 36 and 20 in vertical form on the chalkboard. Depending on the ability of the children, you may wish to have them state the sum directly or to suggest a way to find the sum using the objects for grouping. Some children will think of the procedures used for the previous three pages. If you prefer, use the one suggested for the second activity in *Before Using the Page* on page T155 in which 24 and 3 are written in vertical form. Repeat for several other exercises.
- You may have the children work alone or with a partner, using objects for grouping by tens as on page T155, or you may adopt the following procedure.

Have children work alone using their abacus charts and nine groups of ten and nine ones. Write the numeral 37 on the chalkboard several times for use as an addend. Have the children

represent 37 by using objects on the abacus charts. Ask the children to place some more groups of ten on the chart. Ask how many tens they placed and what number is represented. Write a numeral below each 37 for as many different multiples of ten as the children have suggested. Then have the children determine the number of ones in all and the number of tens in all on their charts. Ask them to state the number.

### Using the Page

- Discuss the completed exercise with the children. Also discuss the two illustrated exercises and then let the children work independently.

After the children have completed the page, ask them what they notice about the sums for the six exercises inside the frame.

Complete the patterns.

$$\begin{array}{r} 24 \\ + 10 \\ \hline 34 \end{array}$$

$$\begin{array}{r} 24 \\ + 20 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 24 \\ + 30 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 24 \\ + 40 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 24 \\ + 50 \\ \hline 74 \end{array}$$

$$\begin{array}{r} 24 \\ + 60 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 34 \\ + 20 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 35 \\ + 20 \\ \hline 55 \end{array}$$

$$\begin{array}{r} 36 \\ + 20 \\ \hline 56 \end{array}$$

$$\begin{array}{r} 37 \\ + 20 \\ \hline 57 \end{array}$$

$$\begin{array}{r} 38 \\ + 20 \\ \hline 58 \end{array}$$

$$\begin{array}{r} 39 \\ + 20 \\ \hline 59 \end{array}$$

$$\begin{array}{r} 17 \\ + 30 \\ \hline 47 \end{array}$$

$$\begin{array}{r} 27 \\ + 30 \\ \hline 57 \end{array}$$

$$\begin{array}{r} 37 \\ + 30 \\ \hline 67 \end{array}$$

$$\begin{array}{r} 47 \\ + 30 \\ \hline 77 \end{array}$$

$$\begin{array}{r} 57 \\ + 30 \\ \hline 87 \end{array}$$

$$\begin{array}{r} 67 \\ + 30 \\ \hline 97 \end{array}$$

$$\begin{array}{r} 10 \\ + 5 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 20 \\ + 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 30 \\ + 5 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 40 \\ + 5 \\ \hline 45 \end{array}$$

$$\begin{array}{r} 50 \\ + 5 \\ \hline 55 \end{array}$$

$$\begin{array}{r} 60 \\ + 5 \\ \hline 65 \end{array}$$

$$3 + 6 = 9$$

$$32 + 5 = 37$$

$$13 + 6 = 19$$

$$42 + 5 = 47$$

$$23 + 6 = 29$$

$$52 + 5 = 57$$

$$33 + 6 = 39$$

$$62 + 5 = 67$$

$$43 + 6 = 49$$

$$72 + 5 = 77$$

$$53 + 6 = 59$$

$$82 + 5 = 87$$

$$63 + 6 = 69$$

$$92 + 5 = 97$$



Completing number patterns sums to 99

(one hundred twenty-three) 123

## LESSON OUTCOME

Complete number patterns, no regrouping, sums to 99

### Materials

demonstration number line for 0 to 100, matching number strips for 1 to 10

## RELATED ACTIVITIES

- You may wish to have the children complete the patterns for the last two sequences on the page by having them write the missing sentences.

$$73 + 6 = 79 \quad 2 + 5 = 7$$

$$83 + 6 = 89 \quad 12 + 5 = 17$$

$$93 + 6 = 99 \quad 22 + 5 = 27$$

- Have the children invent their own sequences and write the addition sentences. Some children may be able to invent patterns for other children to identify.

## LESSON ACTIVITY

### Before Using the Page

- Use the classroom demonstration number line for 0 to 100 and matching number strips for 1 to 10. Use the five-strip on the number line to demonstrate the pattern when 5 is added to the numbers indicated below.

$$\begin{array}{r} 4 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 24 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 34 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 44 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ + 5 \\ \hline \end{array}$$

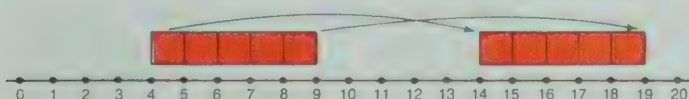
$$\begin{array}{r} 64 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 74 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 84 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 94 \\ + 5 \\ \hline \end{array}$$

To do this, place the five-strip above the number line, starting at 4 and noting that it ends at 9. Then start at 14 and note that the number strip ends at 19. Continue to 94. Have children help to place the strip each time and write the corresponding sum.



At some point in the procedure, have children predict what the sum will be before the strip is placed. You may have them write the sums for the last two or three exercises before the strip is placed on the number line as a check.

For repeating the procedure, children may help to select the addends and at the same time practise addition of 10 and a two-digit number, as follows. Have a child choose a number less than 10. If the child selects 3, for example, write it on the chalkboard and ask what number is ten greater than 3. Write 13 and ask what number is ten greater than 13. Continue in this way to obtain the set of first addends 3, 13, 23, 33, . . . , 93. In order that regrouping does not become part of the discussion yet, you should select an appropriate number for the second addend, in this case, a number less than 7.

### Using the Page

- A discussion of the page may not be necessary before the children begin. As they work, certain patterns will be revealed in the sums. These patterns should be discussed with the children after they have completed the page.



# LESSON OUTCOME



Add two-digit numbers, no regrouping, sums to 99

## Materials

objects for grouping by tens, an abacus chart for each child

## RELATED ACTIVITIES

- Prepare a work sheet showing groups of tens and ones. Have the children write the numbers using expanded notation and then standard notation. Have them find the sum using each form.

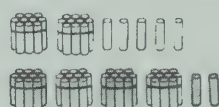
|  |          |       |
|--|----------|-------|
|  | $30 + 5$ | 35    |
|  | $10 + 4$ | $+14$ |
|  |          | 49    |

- A great deal of the success that children have in finding sums of two-digit numbers depends on their mastery of addition facts having sums to 9. Conduct one-minute practice tests whenever possible.

## LESSON ACTIVITY

### Before Using the Page

- This page is the last in the series of steps leading the children to addition of two-digit numbers without regrouping. Start by reviewing addition of tens and ones in columns, using exercises similar to those for the previous lessons.
- Write  $32 + 46$  in vertical form on the chalkboard. Have children read the numbers. As a result of the earlier work in this unit, children may be ready to state what the sum is. If so, let them. Then have them verify their answers by using objects for grouping by tens to represent each number, joining the two sets, counting all the tens and the ones, and stating the sum. Children who still need guidance to reinforce the procedure should be directed through the familiar steps suggested on page T153. Repeat for several other exercises.
- Have the children work alone or in pairs with their abacus charts and nine groups of ten and nine ones. One child places some groups of ten and ones on the abacus chart and writes the numeral on paper. The partner places more groups of ten and ones on the chart in separate groups from those placed by the



$$\begin{array}{r} 2 \text{ tens } 5 \text{ ones} \\ + 4 \text{ tens } 2 \text{ ones} \\ \hline 6 \text{ tens } 7 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 2    | 5    |
| + 4  | 2    |
| 6    | 7    |

$$\begin{array}{r} 25 \\ + 42 \\ \hline 67 \end{array}$$

Complete.

| tens | ones |
|------|------|
| 1    | 3    |
| + 2  | 2    |
| 3    | 5    |

$$\begin{array}{r} 13 \\ + 22 \\ \hline 35 \end{array}$$

| tens | ones |
|------|------|
| 2    | 6    |
| + 3  | 2    |
| 5    | 8    |

$$\begin{array}{r} 26 \\ + 32 \\ \hline 58 \end{array}$$

| tens | ones |
|------|------|
| 4    | 3    |
| + 3  | 5    |
| 7    | 8    |

$$\begin{array}{r} 43 \\ + 35 \\ \hline 78 \end{array}$$

| tens | ones |
|------|------|
| 2    | 1    |
| + 2  | 8    |
| 4    | 9    |

$$\begin{array}{r} 21 \\ + 28 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 11 \\ + 35 \\ \hline 46 \end{array}$$

$$\begin{array}{r} 45 \\ + 51 \\ \hline 96 \end{array}$$

$$\begin{array}{r} 35 \\ + 44 \\ \hline 79 \end{array}$$

$$\begin{array}{r} 72 \\ + 15 \\ \hline 87 \end{array}$$

$$\begin{array}{r} 43 \\ + 26 \\ \hline 69 \end{array}$$

$$\begin{array}{r} 61 \\ + 17 \\ \hline 78 \end{array}$$

$$\begin{array}{r} 67 \\ + 32 \\ \hline 99 \end{array}$$

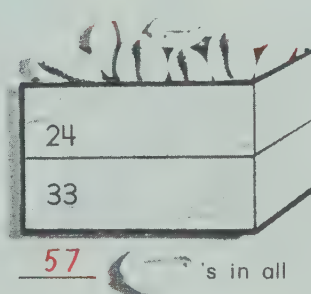
$$\begin{array}{r} 22 \\ + 16 \\ \hline 38 \end{array}$$

$$\begin{array}{r} 85 \\ + 13 \\ \hline 98 \end{array}$$

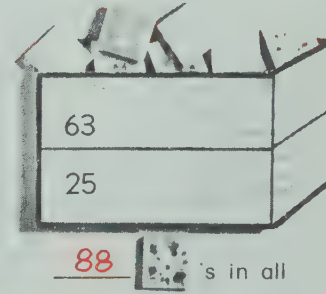
$$\begin{array}{r} 23 \\ + 73 \\ \hline 96 \end{array}$$

$$\begin{array}{r} 14 \\ + 61 \\ \hline 75 \end{array}$$

$$\begin{array}{r} 33 \\ + 24 \\ \hline 57 \end{array}$$



's in all



's in all

124 (one hundred twenty-four)

Adding two-digit numbers, no regrouping

first child and writes the numeral below the first one on the paper. One child writes the sum on the paper and the partner checks the answer by joining the two sets on the abacus chart and counting the groups of ten and the ones.

- Ask a child to write on the chalkboard the numbers mentioned in the following problem as you read it slowly: "At the beach I found 25 shells. Then I found 13 more shells. How many shells did I find in all?" Ask how you could find out how many shells there are altogether. On the chalkboard, have a child show the numbers in vertical form and include the symbol +. Have another child write the answer on the chalkboard. Repeat the procedure for other problems.

### Using the Page

- Discuss the completed exercise at the top of the page, emphasizing addition in columns of tens and ones: "Five ones and two ones are seven ones; two tens and four tens are six tens; six tens seven ones equals sixty-seven. Twenty-five plus forty-two equals sixty-seven." As the children work on the page, help those who are having difficulty. Let them use objects for grouping by tens, if they wish.

## LESSON OUTCOME

Add two-digit numbers, no regrouping, sums to 99

## Materials

objects for grouping by tens, place-value pocket chart, sticks

## Vocabulary

place-value chart

## RELATED ACTIVITIES

• Give each child a copy of the number chart on page T333. Have the children follow instructions similar to the following:

1. Color red the square for 53. Find the number that is 10 greater than 53. Color the square red.
2. Color orange the square for 26. Find the number that is 20 greater than 26. Color the square orange.

Continue in this way, having the children change colors for each pair of numbers. The chart can also be used to find sums such as  $32 + 25$ . Children would start at 32, find the number that is 20 greater (move down two squares in the same column), and then the number that is 5 greater than that number (move 5 squares to the right in the same row).

• For a review of ordering two-digit numbers, have the children write in order the sums in each row on page 125. For the second row, for example, the children would write 49, 52, 65, 76, 88, 94.

Add.

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| $\begin{array}{r} 30 \\ + 10 \\ \hline 40 \end{array}$ | $\begin{array}{r} 20 \\ + 60 \\ \hline 80 \end{array}$ | $\begin{array}{r} 50 \\ + 20 \\ \hline 70 \end{array}$ | $\begin{array}{r} 20 \\ + 30 \\ \hline 50 \end{array}$ | $\begin{array}{r} 30 \\ + 30 \\ \hline 60 \end{array}$ | $\begin{array}{r} 30 \\ + 60 \\ \hline 90 \end{array}$ |
| $\begin{array}{r} 40 \\ + 9 \\ \hline 49 \end{array}$  | $\begin{array}{r} 8 \\ + 80 \\ \hline 88 \end{array}$  | $\begin{array}{r} 70 \\ + 6 \\ \hline 76 \end{array}$  | $\begin{array}{r} 2 \\ + 50 \\ \hline 52 \end{array}$  | $\begin{array}{r} 90 \\ + 4 \\ \hline 94 \end{array}$  | $\begin{array}{r} 5 \\ + 60 \\ \hline 65 \end{array}$  |
| $\begin{array}{r} 34 \\ + 3 \\ \hline 37 \end{array}$  | $\begin{array}{r} 12 \\ + 5 \\ \hline 17 \end{array}$  | $\begin{array}{r} 61 \\ + 7 \\ \hline 68 \end{array}$  | $\begin{array}{r} 81 \\ + 5 \\ \hline 86 \end{array}$  | $\begin{array}{r} 76 \\ + 2 \\ \hline 78 \end{array}$  | $\begin{array}{r} 24 \\ + 4 \\ \hline 28 \end{array}$  |
| $\begin{array}{r} 59 \\ + 30 \\ \hline 89 \end{array}$ | $\begin{array}{r} 40 \\ + 22 \\ \hline 62 \end{array}$ | $\begin{array}{r} 43 \\ + 50 \\ \hline 93 \end{array}$ | $\begin{array}{r} 30 \\ + 47 \\ \hline 77 \end{array}$ | $\begin{array}{r} 24 \\ + 20 \\ \hline 44 \end{array}$ | $\begin{array}{r} 10 \\ + 61 \\ \hline 71 \end{array}$ |
| $\begin{array}{r} 63 \\ + 12 \\ \hline 75 \end{array}$ | $\begin{array}{r} 31 \\ + 52 \\ \hline 83 \end{array}$ | $\begin{array}{r} 12 \\ + 37 \\ \hline 49 \end{array}$ | $\begin{array}{r} 42 \\ + 14 \\ \hline 56 \end{array}$ | $\begin{array}{r} 57 \\ + 11 \\ \hline 68 \end{array}$ | $\begin{array}{r} 11 \\ + 14 \\ \hline 25 \end{array}$ |
| $\begin{array}{r} 22 \\ + 22 \\ \hline 44 \end{array}$ | $\begin{array}{r} 23 \\ + 32 \\ \hline 55 \end{array}$ | $\begin{array}{r} 24 \\ + 42 \\ \hline 66 \end{array}$ | $\begin{array}{r} 25 \\ + 52 \\ \hline 77 \end{array}$ | $\begin{array}{r} 26 \\ + 62 \\ \hline 88 \end{array}$ | $\begin{array}{r} 27 \\ + 72 \\ \hline 99 \end{array}$ |

Addition practice sums to 99

(one hundred twenty-five) 125

## LESSON ACTIVITY

## Before Using the Page

- To review the addition of two-digit numbers, introduce the children to the place-value pocket chart. (See page xxxi.) Have a child choose a number less than 100. Using objects for grouping by tens, have one child display the number of tens needed and another child display the number of ones needed. For each group of ten, place one stick in the tens' pocket of the chart. For each of the ones, place one stick in the ones' pocket. Have a child select the correct numeral card for the number of tens and place it in the slit in the tens' pocket. Ask a child to do the same for the ones. Ask the children to state the number of tens and the number of ones, and tell what the number is.
- Write two-digit numbers on the chalkboard. Ask children to represent these numbers by placing sticks in the tens' and the ones' pockets of the place-value pocket chart. Numbers for which the digits are reversed should be considered in pairs, for example, 53 and 35, 74 and 47.
- Write addition exercises on the chalkboard. Have children use the place-value pocket chart to determine the sums. Ask a child

to place sticks in the pockets for the first addend. Ask another child to do the same for the second addend. Ask a third child to place a numeral card in each slit to show the number of sticks in each pocket and then write the sum on the chalkboard.

## Using the Page

- Let the children work independently on this page. As they complete the exercises in the first five rows, they will be reviewing the steps presented in the development of adding two-digit numbers on pages 119 to 124. The last row presents exercises for which the digits of one addend are interchanged to obtain the digits for the other addend.
- After the children have completed the page, discuss the sums obtained for the exercises in the last row. Some children may be interested in exploring this type of exercise further. Name a number as one addend. Have children suggest what the second addend should be and find the sum. Some appropriate numbers are 14 (for  $14 + 41 = 55$ ), 21, 35, 42, 51, 63, 71, and 81.



## LESSON OUTCOME

Add amounts of money, no regrouping, sums to 99 cents

### Materials

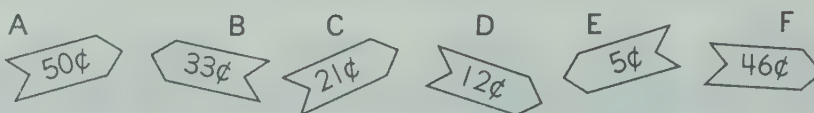
real money, play money, or coin cutouts from copies of page T327, play store or store chart, objects marked with various prices to 99¢, “bills” for recording purchases (optional)

### RELATED ACTIVITIES

- You may wish to have children purchase other pairs of items shown on the page. Buying E and F would result in regrouping, but this example is a fairly simple one to handle without a discussion of regrouping. The children may simply count on from 46.

A discussion of how much change or how much more money is needed for each purchase would be worthwhile.

- For a more challenging activity, ask the children to pretend that they have 50¢ to spend and have them find which two items can be bought. There are five possible pairs: B and D, B and E, C and D, C and E, D and E.



Complete.

| Buy    | How much?   | You have | Do you need more money?                                       |
|--------|---|----------|---|
| C<br>D | $\begin{array}{r} 21 \\ + 12 \\ \hline 33 \end{array} \text{¢}$ | 35¢      | Yes <input type="radio"/> No <input checked="" type="radio"/> |
| D<br>E | $\begin{array}{r} 12 \\ + 5 \\ \hline 17 \end{array} \text{¢}$  | 15¢      | <input checked="" type="radio"/> Yes <input type="radio"/> No |
| A<br>C | $\begin{array}{r} 50 \\ + 21 \\ \hline 71 \end{array} \text{¢}$ | 75¢      | Yes <input type="radio"/> No <input checked="" type="radio"/> |
| B<br>C | $\begin{array}{r} 33 \\ + 21 \\ \hline 54 \end{array} \text{¢}$ | 55¢      | Yes <input type="radio"/> No <input checked="" type="radio"/> |
| B<br>F | $\begin{array}{r} 33 \\ + 46 \\ \hline 79 \end{array} \text{¢}$ | 75¢      | <input checked="" type="radio"/> Yes <input type="radio"/> No |

126 (one hundred twenty-six)

Adding with money, amounts to 99 cents

## LESSON ACTIVITY

### Before Using the Page

- Display sets of dimes and pennies for amounts to 99 cents and have children determine each amount of money. Ensure that they count the dimes before the pennies.
- Write amounts of money on the chalkboard (67¢, 32¢, 85¢) and have children use dimes and pennies to represent these amounts.
- State a number of dimes and a number of pennies, for example, 3 dimes 4 pennies. Have children state the amount of money (34 cents). Repeat for other sets of coins.
- Use the play store or a store chart. Display objects marked with prices such as 49¢, 64¢, 36¢, 18¢, 75¢. Choose two objects and tell the children that you wish to buy these objects and they are to determine the total price. (Check that regrouping is not necessary.) Write the first amount on the chalkboard. Ask a child to display dimes and pennies for that amount. Write the second amount under the first one on the chalkboard, and ask a child to display dimes and pennies for it. Have a child join the two sets of dimes and pennies and state how many there are of

each. Ask what amount of money this is. Then verify by adding the two numbers on the chalkboard. Repeat the procedure for other pairs of objects.

- You may wish to prepare “bills” for the children to use for this activity. Give each child 9 dimes and 9 pennies. Have them select two objects from the play store and make out a bill to show the amount of money to be paid. They may use their dimes and pennies to pay for their purchases. This activity can be extended by having the children count the dimes and pennies not used and show the amount on the back of the bill.

### Using the Page

- Read the words at the top of the chart to make sure the children understand them. Discuss the first exercise with them. Ask which items are being bought and what their prices are. Have the children determine the amount to be paid. Ask them to decide whether 35¢ is enough money to make the purchase and then ring the correct word in the last column. Let the children continue on their own.

## OBJECTIVE

Complete a table of basic addition facts for sums to 18

## Materials

pocket chart and 36 cards showing the basic addition facts in vertical form for sums from 11 to 18, a piece of cardboard and a paper clip and a pronged paper fastener for each child to make a number spinner

## RELATED ACTIVITIES

- You may wish to have the children play the game "Tick-Tack-Three" described on page T163.

Play the game.

| + | 0 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|---|---|----|----|----|----|----|----|----|----|----|
| 0 | 0 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 1 | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
| 2 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
| 3 | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
| 4 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 |
| 5 | 5 | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 |
| 6 | 6 | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
| 7 | 7 | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 8 | 8 | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 9 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

Use a spinner. Spin twice, add, and write the sum



Reviewing addition facts, sums to 18

(one hundred twenty-seven) 127

## LESSON ACTIVITY

### Before Using the Page

- Prepare a pocket chart from cardboard and library card pockets. Use 36 cards showing the basic addition facts in vertical form (sums from 11 to 18). Have children in turn place a card in the appropriate pocket.

After all the cards have been placed in the pockets, have children sort the cards for each pocket and order them according to the first addend. For example, for 11, the cards would be arranged with  $2 + 9$  first,  $3 + 8$  behind this, then  $4 + 7$ , and so on, to  $9 + 2$ .

- Have each child prepare a number spinner as described on page T163.

|         |         |         |         |
|---------|---------|---------|---------|
| 9<br>+2 | 6<br>+6 | 8<br>+5 | 6<br>+8 |
| 11      | 12      | 13      | 14      |
| 15      | 16      | 17      | 18      |

### Using the Page

- Display a copy of page T335 marked to serve as an addition table. Use one child's spinner to obtain one number. Have a child point to the number in the first column of the table and keep her/his finger there. Have another child use the spinner to obtain a second number. Have a child point to that number in the top row. Now have the two children trace with their fingers along the row and down the column till they meet in the same square. Write the sum in this square. Repeat for other pairs of numbers.

The children may use page 127 and their spinner and play alone. Specify a number of turns as the goal for the day or set a time limit.

If you prefer to have the children play in pairs, have them use only one page, take turns spinning the paper clip twice, and use a crayon to write the sum in the array. Each player should use a different color. If a sum has already been recorded, the player must wait until her/his next turn. At the end of a time limit, the player with the greatest number of sums in her/his color wins.



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## Materials

pocket chart and cards as described on page T161, objects for grouping by tens, real money, play money, or coin cutouts from copies of page T327, place-value pocket chart for each child, a paper-plate clock face for each child, a square piece of paper for each child

## RELATED ACTIVITIES

- Use the pocket chart described on page T161 to review the basic addition facts having sums of 11 to 18. Divide the class into two teams. Shuffle the cards and place half of them in one box for one team and half in another box for the other team. The first member of one team draws a card and places it in a pocket. If correct, a point is scored. If not, the card is removed and placed in a separate pile. The other team follows the same procedure with its cards. At the end of a given time, the team having the most points is the winner.

- You may wish to have the children play the game "Bingo Facts" described on page T322.

Complete.

$$\begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 15 \\ - 6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 9 \\ + 7 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 15 \\ - 8 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 6 \\ + 9 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 16 \\ - 9 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 17 \\ - 8 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$$

$$36 = \underline{3} \text{ tens } \underline{6} \text{ ones}$$

$$5 \text{ tens } 9 \text{ ones} = \underline{59}$$

$$47 = \underline{4} \text{ tens } \underline{7} \text{ ones}$$

$$8 \text{ tens } 2 \text{ ones} = \underline{82}$$

$$\begin{array}{r} 40 \\ + 20 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 30 \\ + 7 \\ \hline 37 \end{array}$$

$$\begin{array}{r} 23 \\ + 5 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 62 \\ + 30 \\ \hline 92 \end{array}$$

$$\begin{array}{r} 17 \\ + 82 \\ \hline 99 \end{array}$$

$$\begin{array}{r} 24 \\ + 65 \\ \hline 89 \end{array}$$

Bob has 15 stamps.  
Cathy has 9 stamps.  
How many more has Bob?

$$\underline{15 - 9 = 6}$$
  

6 stamps

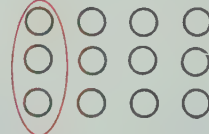
How much do they cost?

$$\begin{array}{r} 23¢ \\ + 75¢ \\ \hline 98¢ \end{array}$$

Color one fourth.



Ring one fourth.



Write the time shown.



3:30



8:15



5:45

128 (one hundred twenty-eight)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- Review the major concepts of this unit by using some of the preliminary activities for the pages. Other suggestions are given below.

- Place all the cards for the addition facts in their correct pockets of the pocket chart described on page T161. Have a child select a card from a pocket and write one (or two) related subtraction sentences. For example, if the card for 9 and 2 is selected from the pocket for 11, the child would write the subtraction sentence  $11 - 2 = 9$  and/or  $11 - 9 = 2$ .
- Have children represent two-digit numbers using objects for grouping by tens, then dimes and pennies, and finally the place-value pocket chart. Review the procedure for adding two-digit numbers.
- A number line marked in multiples of ten is useful for demonstrating sums of multiples of ten.
- Review telling time, to the quarter hour. The children may play the game "What's the Time, My Friend?" Say, "I am thinking of a time when the short hand is between 7 and 8 and

the long hand points to 3. What's the time, my friend?" Children may use their paper-plate clock faces to help them find the answer. The child who first states the correct answer becomes the leader.

- Have the children solve story problems similar to these:  
 I collected 14 shells. There are 42 boys in Grade 2.  
 I gave away 5 shells. There are 36 girls in Grade 2.  
 How many shells are left? How many children are there in Grade 2?
- Have each child fold a square piece of paper twice to obtain fourths. Have the children color one fourth and print  $\frac{1}{4}$  on another fourth. Have them turn the paper over and use the fourths to show how they would share 12 peanuts equally among four children.

### Using the Page

- Discuss with the children how they are to complete the different types of exercises. Then let them work independently. Observe the children as they work and give help whenever they need it. Note the difficulties that children encounter.

# Games and Activities

## Scoring Sets (Game for page 106)

### Materials

30 cards showing five different addition phrases for each number from 10 to 15

### Rules

1. Shuffle the cards and deal five to each player.
2. Place the remaining cards face down to form a drawing pile.
3. The players display two or more cards that show names for the same number. Then they take turns drawing the top card from the drawing pile and placing the card in a set already formed or with one other card to form a new set.
4. The winner may be the player who first displays all her/his cards or the player having the fewest cards left at the end of a given time.

## How Many More? (Game for page 112)

### Materials

a die marked 2, 4, 7, 9, 10, 11  
a die marked 3, 5, 6, 8, 10, 11  
small objects for making sets

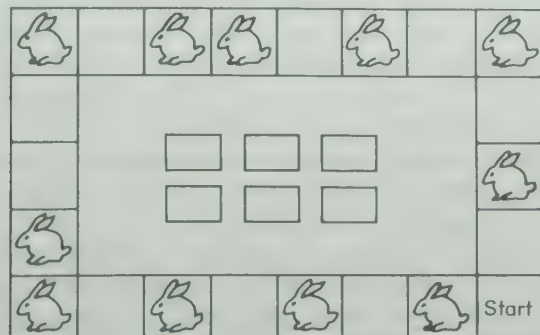
### Rules

1. Each player tosses one die and forms a set of objects according to the number tossed.
2. The two sets are compared to see which player has more objects.
3. The player who has more objects writes a subtraction sentence to determine how many more. If the sentence is correct, the player scores a point.
4. The player having the most points after six tosses of the die is declared the winner. The game may be adapted so that the player with the fewest points is the winner.

## Time Will Tell (Game for page 116)

### Materials

a game board as shown  
a spinner for selecting numbers from 1 to 12  
a marker for each player  
12 time cards, for example, 2:30, 3:45, 5:15, 6:00  
12 cards with clock faces showing the times chosen

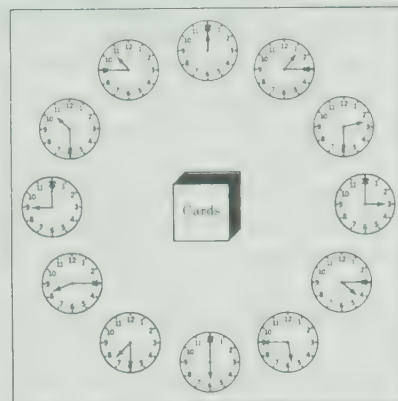


### Rules

1. All the cards with clock faces are displayed face up. Six time cards are placed face down in the centre of the game board.

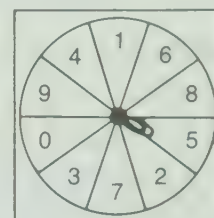
2. The players use the spinner and move their markers the number of hops indicated.
3. A player who lands on a rabbit turns one time card over and matches it with the appropriate clock face, claiming both cards.
4. The time card is replaced by one from those not yet used, and the game continues until all the time cards are used.
5. The player who has the most cards is the winner.

## Game Board for page 117



## Number Spinner for page 127

• Give each child a piece of cardboard showing a circle marked into ten equal parts, a pronged paper fastener, and a paper clip. Have the children print the numerals 0 to 9 in any order inside the circle. The cardboard should have a small hole punched at the centre of the circle. Have the children push the paper fastener through the paper clip and then through the hole at the centre of the circle. If this is done loosely, the paper clip will spin quite easily.



## Tick-Tack-Three (Game for page 127)

### Materials

one die marked 4, 5, 6, 7, 8, 9  
one die marked 6, 7, 7, 8, 8, 9  
one chart for the sums 10 to 18, covered with acetate  
two pens for marking on acetate

| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|----|----|----|----|----|----|----|----|----|
| X  | O  | X  | X  | O  | X  | O  | X  | O  |
| O  | X  | O  | O  | X  | O  | X  | X  | O  |
| X  | X  | X  |    | O  | X  |    | O  | O  |
|    |    |    |    |    |    |    |    |    |
|    |    |    |    |    |    |    |    |    |

### Rules

1. Each player takes a turn tossing the dice, adding the two numbers obtained, and placing her/his mark (X or O) in the column for that sum.
2. When a player has three marks in a row, he/she draws a loop around the marks.
3. The game continues until no more loops can be formed.
4. The player having the greatest number of loops is the winner.



## Unit 7 Overview

Subtraction from two-digit numbers without regrouping receives the most attention in this unit. A step-by-step approach is used again and four separate stages of development are taken in sequence: tens subtracted from tens, ones subtracted from tens and ones, tens subtracted from tens and ones, and tens and ones subtracted from tens and ones. Numeration is extended to three-place numerals and children read and write numerals and names for numbers to 200. The concepts and symbols for fractions showing halves and fourths are reviewed. The fraction concept *one-third* is introduced and children identify and mark thirds of whole objects and sets. Fractions from *one-tenth* to *nine-tenths* are represented in graphic and symbolic form. This leads directly to the use of the *decimetre* as a unit of linear measurement, which is one-tenth of a metre. Coins are used to represent values to 99 cents and the dollar is introduced as a monetary unit equal in value to 100 cents. A vertical bar graph is made and from the data represented comparisons are made, first by visual study of the graph and then by subtraction. Sets of exercises provide practice in addition and subtraction and in using them to solve simple word problems. The last lesson is a *Checkup* on all the new material of the unit, except the use of the *decimetre* in measuring length.

### Unit Outcomes

#### Number

- complete and interpret a vertical bar graph
- subtract multiples of ten, minuends to 90
- subtract one-digit numbers from two-digit numbers, no regrouping, minuends to 99
- subtract multiples of ten from two-digit numbers, minuends to 99
- subtract two-digit numbers, no regrouping, minuends to 99
- subtract amounts of money, no regrouping, minuends to 99 cents
- recognize one-third of a whole or a set; use the symbol  $\frac{1}{3}$
- identify halves, thirds, and fourths
- recognize one-tenth of a whole; use the symbol  $\frac{1}{10}$
- show from one-tenth to nine-tenths of a whole
- identify sets of hundreds, to 900
- identify a set of hundreds, a set of tens, and a set of ones and write the corresponding three-place numeral, numbers to 199
- write numerals in sequence for the numbers from 100 to 200
- add and subtract two-digit numbers, no regrouping, sums and minuends to 99
- solve a word problem requiring addition or subtraction, sums and minuends to 99

#### Measurement

- use the *decimetre* as a unit of length
- determine the values of sets of coins, to 99 cents
- identify sets of coins having the value of one dollar

#### Background

**Number:** Subtraction with two-digit numbers is introduced in this unit. However, since no regrouping is involved, the children will likely have no difficulty with this topic because the basic subtraction facts having minuends to 9 that are used with ones are also used with tens.

Making and interpreting vertical bar graphs involve the same skills as for horizontal bar graphs, which were introduced in Unit 1. A one-to-one scale is suggested to record the results of tallying, but if the numbers are too large, a many-to-one scale can be used. This feature of graphing was presented in Unit 6 for the pictograph.

The work on fractions develops the concepts of thirds and tenths. Because halves and fourths were presented earlier, children may now develop a better understanding that as the number of equal parts of a whole increases, the parts become smaller and smaller. For example, for a given object or set, fourths are smaller than thirds because there are more equal parts. Similarly, tenths are much smaller than thirds or fourths. Tenths are presented at this time because their use is increasing with the introduction of the metric system.

Three-place numerals provide another opportunity to emphasize ten as the base of our numeration system. The number *one* is represented by the digit 1. To represent ten ones (one ten) the digit 1 is used again, but it is written one place to the left and a 0 is written in the ones' place. Similarly, to represent ten tens (one hundred) the digit 1 is written one more place to the left and another 0 is written to its right. Many children readily recognize 10 as representing *ten* and 100 as representing *one hundred* from their out-of-school experiences, but they frequently fail to realize the 10 tens implied by the numeral 100.

A three-place numeral represents hundreds, tens, and ones, and a digit in any of the three places signifies both its face value and its place value. In the numeral 145, the digit 5 has the greatest face value and the smallest place value. The digit 1 is the most significant because its place value is hundreds, while the 4 represents tens and the 5 represents ones. Note that a three-place numeral such as 145 is read "one hundred forty-five" – the word *and* is used with decimals and mixed numbers. For example, 2.5 may be read "two and five tenths" and  $4\frac{1}{2}$  as "four and one-half".

**Measurement:** The fractional concept of one-tenth is applied to the metre to establish the meaning of the term *decimetre* and the relationship of the *decimetre* to the metre. Although the centimetre and the millimetre are used more widely in measurement, the *decimetre* can serve a useful purpose as an intermediate unit of measurement between the metre and the centimetre. The centimetre will be introduced in Unit 8.

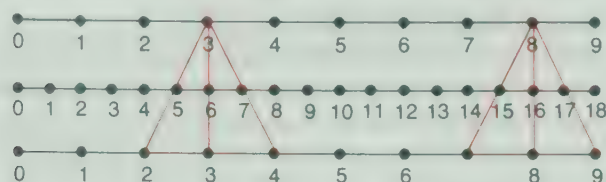
#### Teaching Strategies

If the children have been grouped previously for instruction in number and operations, continue this practice, grouping the children according to the results of the *Checkup* at the end of Unit 6. For Unit 7, the class may be taken as a whole or grouped differently for graphing, money, fractions, and measurement, since these topics do not require a uniform foundation of number concepts and skills. Restructuring class groups for these topics provides a change of pace and allows children of different abilities to work together.

Work with two-digit and three-digit numbers can be performed effectively through the use of abacus charts, and it is suggested that each child have one. The charts are particularly useful if covered with acetate so that the children can write on them with special markers and clean and reuse them repeatedly. Place-value pocket charts may also be used with the children, not only in developing the lessons but also in checking on their understanding and skills in working with numbers.

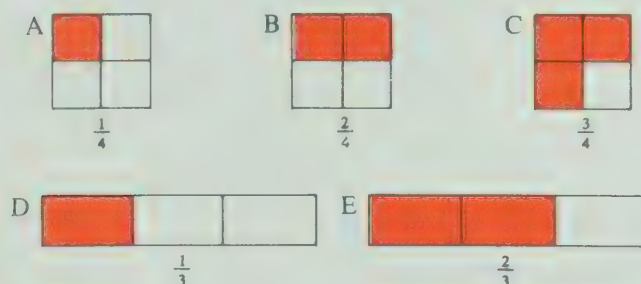


Activities on page T174 and illustrated on page T189 is known as a *nomograph*. A large nomograph covered with acetate is particularly useful for illustrating addition and subtraction facts.



Since the numbers on the top line are in the same positions as the numbers on the bottom line, sums for “doubles”, for example,  $3 + 3$ ,  $4 + 4$ ,  $8 + 8$ , are easily seen on the middle line. The “doubles” can lead to other facts sometimes known as “near doubles”, for example,  $3 + 2$ ,  $3 + 4$ . “Doubles” and “near doubles” can be used to review basic facts and to develop greater understanding of number relationships. The nomograph is also effective for illustrating that for any given sum, one addend increases by the amount that the other addend decreases. That is, the line passing through a sum moves as far to the left on one line as it does to the right on the other.

The work with fractions involves unit fractions (those with 1 as the numerator) and such fractions as  $\frac{2}{3}$ ,  $\frac{3}{4}$ ,  $\frac{7}{10}$ . Extra attention should be directed to the significance of the two parts of a fraction. The numeral above the bar indicates “how many” parts are being considered (the *number* of parts), and the numeral below the bar indicates the size of the parts (the *name* of the parts). These concepts may be discovered by the children through a carefully guided study of selected models similar to these.



How many parts of A are red?

How many parts of D are red?

What name tells the size of each part of A?

What name tells the size of each part of D?

What number tells how many parts of B are red?

What number tells how many parts of E are red?

What number names the size of each part of B?

What number names the size of each part of E?

In the fraction  $\frac{3}{4}$ , what does the 3 tell about C? What does the 4 tell about C?

For the horizontal bar graph in Unit 1 the children could easily determine the number of squares to be colored for each bar because the items being counted were shown on the page. In this unit the children will need guidance in using an organized approach to collecting the necessary data first. This may involve taking a poll and making tallies. Other topics for graphing may arise quite naturally out of discussions in other subject areas. For example, leaves from a leaf collection can be sorted into categories and counted; weather information marked on a class calendar for one month can be graphed to show how many days were sunny, rainy, or cloudy. The work with vertical bar graphs may

gathered by the children over a period of time. Meanwhile, the work with numbers and operations should proceed, but opportunities should be provided for children to work on their graphs from time to time.

Evaluation of children’s growth in measurement topics cannot be carried out effectively by exercises requiring the paper-and-pencil technique; for this reason, measurement using the decimetre is not included in the *Checkup* at the end of the unit. It is necessary, therefore, for the teacher to observe how well children carry out the suggested measurement activities. Some children may need to be reminded that the decimetre strips must be placed end to end, without overlapping and without leaving gaps.

## Materials

poems or stories about animals and pets

large and small sheets of squared paper

objects for grouping by tens

an abacus chart for each child

demonstration number line for 0 to 100, matching number strips for 1 to 10

a copy of page T333 and crayons for each child

real money, play money, or coin cutouts from copies of page

T327, one-dollar bills

objects having tags showing prices from 40¢ to 99¢

cards showing amounts of money to 99¢

play store or store chart

paper shapes marked to show halves, thirds, fourths, and unequal parts

display board and cutouts, yarn or string

identical circular shapes cut to show halves, thirds, fourths, and tenths, other shapes showing tenths and some that do not show tenths

paper strips having the same length and marked to show halves, thirds, fourths, and tenths

cards illustrating halves, thirds, fourths, tenths

flash cards for the fraction names *one-tenth* to *nine-tenths*

flash cards for the symbols  $\frac{1}{10}$  to  $\frac{9}{10}$

decimetre strips, unmarked metre sticks

tape, string, various bottles, cans, and jars

Base Ten Blocks or models for tens and hundreds made from copies of page T336 pasted on Bristol board

number board or number chart for 1 to 100, tags for the numbers from 101 to 200

place-value pocket chart, sticks, and numeral cards

an abacus for each child

## Vocabulary

one-third

two-thirds

thirds

two-fourths

three-fourths

one-tenth

tenths

names *one-tenth* to *nine-tenths*

names *one hundred* to *nine hundred*

names *one hundred one* to *one hundred ninety-nine*

decimetre

one dollar



## Unit 7 Theme – Transportation

The purpose of this theme is to create an awareness of the variety of methods of transportation and to encourage the children to think about the methods that affect their own lives. It is hoped that the children will develop an appreciation of transportation and its place in history.

Set up a display of pictures and models that will arouse interest in this theme. Include both reference books and storybooks to provide information on various aspects of transportation.

### LANGUAGE ACTIVITIES

#### 1. Discussing Transportation

Read the following poem to the children.

##### THERE ARE SO MANY WAYS OF GOING PLACES

Big yellow trolley lumbers along,  
Long black subway sings an under song,  
Airplanes swoop and flash in the sky,  
Noisy old elevated goes rocketing by.  
Boats across the water—back and forth they go,  
Big boats and little boats, fast boats and slow.  
Trains puff and thunder; their engines have a headlight;  
They have a special kind of car where you can sleep all night.  
Tall fat buses on the Avenue,  
They will stop for anyone—even—just—you.  
All kinds of autos rush down the street.  
And then there are always—your own two feet.

*Leslie Thompson*

Reread the poem and have the children identify the different ways of going places. Write each way on a chart and discuss that method of transportation with the children.

Ask questions about how many ways of going places are mentioned in the poem and how many of the children have travelled by each method of transportation. Have the children find the words in the poem that tell how the different vehicles move.

After discussing the poem and the different kinds of vehicles mentioned, ask the children to find storybooks in the library about trains, boats, airplanes, and so on. Arrange these books in the transportation display and encourage the children to read them in their spare time.

#### 2. Methods of Transportation

Refer to the list of the different ways of going places mentioned in the poem for Activity 1. Tell the children that these are methods of transportation. Explain that transportation is a means of carrying goods or people from one place to another. Make a list of all the methods of transportation that the children can suggest. Some of the methods are as follows:

|            |               |              |
|------------|---------------|--------------|
| airplane   | cart          | snowmobile   |
| bicycle    | feet          | spaceship    |
| boat       | helicopter    | streetcar    |
| buggy      | horse         | subway train |
| bus        | motorcycle    | train        |
| camper bus | motor scooter | truck        |
| canoe      | skis          | van          |
| car        | sled          | wagon        |

#### 3. Transportation Dictionary

Assign one method of transportation to each child. Have the children cut pictures from magazines and paste them on sheets of paper or draw pictures to illustrate each method. Below the illustrations each child may write several statements about the method of transportation.

Assemble the completed pages in alphabetical order to make a book. Display this dictionary in the transportation display as a reference book.

#### 4. Sounds of Vehicles

Using the list from Activity 2, try to identify a sound associated with each vehicle. A walk around the neighborhood with a tape recorder will supply some of the sounds. Commercial tapes or records can be used for sounds of airplanes, boats, or trains.

Encourage the children to discuss the sounds with respect to

- how they are alike;
- how they are different;
- which vehicles make several sounds;
- which methods of transportation make very little sound;
- which vehicle makes the loudest sound;
- which vehicles make unpleasant sounds;
- which vehicles make pleasant sounds.

#### 5. Reading Traffic Signs

Because there are so many methods of transportation on our roads, it is necessary to control the traffic by keeping it well organized. This control is obtained by the use of traffic signs.

On the walk to collect the sounds of vehicles, point out the signs that direct or control traffic. Have the children reproduce these signs in the classroom. Discuss the meaning of each sign, which signs use words, and which signs use symbols. Also discuss how color and shape are used for signs.

### MATHEMATICS ACTIVITIES

#### 1. Recognizing Shapes

Display pictures of the methods of transportation most familiar to the children. If possible, supply three-dimensional models. Have the children study each vehicle. Discuss which geometric shapes are used in its construction, which of the shapes occurs most often, and which shapes occur only rarely.

Give each child a copy of a picture of some method of transportation. Have the children identify, color, and label several geometric shapes in the vehicle.

#### 2. Symmetry in Vehicles

Refer to pages 60 and 61 in Unit 3 for a review of the concept of symmetry with the children.

Using the models of vehicles, ask the children to show where each vehicle could be cut so that there would be two matching parts.

#### 3. Graphing

Using the list from Language Activity 2, determine how many children have travelled by each method of transportation. The results of this survey can be shown in a pictograph. Display the pictograph and ask the children questions that will reinforce such concepts as *greater than*, *less than*, *how many more*, *how many fewer*.

#### 4. Solving Problems

Have the children create, illustrate, and solve word problems suggested by this theme. You may wish to have them draw pictures or cut pictures from magazines and newspapers that suggest joining or separating situations. These drawings can then be exchanged for interpreting and solving a problem.

### SCIENCE ACTIVITIES

#### 1. Classifying Vehicles

Encourage the children to suggest ways of classifying methods of transportation. Some suggestions are given below.

- vehicles for air, land, or water
- vehicles with two, four, or more than four wheels
- vehicles that carry goods or vehicles that carry people
- vehicles that have motors or vehicles that have no motors

#### 2. All Kinds of . . .

Each particular kind of transportation comes in various sizes and designs. Make four charts labelled "All Kinds of Airplanes", "All Kinds of Boats", "All Kinds of Cars", and "All Kinds of Trucks".

Have the children collect pictures from magazines and newspapers to illustrate the variety in size and design of these vehicles. Attach the pictures to the appropriate chart.

### SOCIAL STUDIES ACTIVITIES

#### 1. Travelling from Place to Place

Throughout history, people have found ways of taking their homes with them while travelling to another destination, travelling for pleasure, or travelling as a way of life. Introduce the children to the following ways of travelling. Display appropriate pictures as you discuss each of the vehicles.

##### *Covered Wagon*

In pioneer times, people gave up their homes in settled areas to move to uninhabited or unsettled areas in the hope of gaining land and a new life. The trip usually took several months, and there were no places to sleep on the way or no stores from which to obtain food. The pioneers travelled in a wagon pulled by two or more horses. Each wagon had a large hood or cover of heavy canvas. Often the wagons travelled in groups of six or eight. Each family carried all their food and possessions in the wagon and slept in it at night. This was probably the first camper trailer.

##### *Gypsy Wagon*

Gypsies were wanderers who travelled about in homes on wheels. This was the only home they had. The wagons were usually covered with a large wooden box. Inside were beds for sleeping and even tables for eating. The wagons were usually painted and decorated with patterns and designs in bright colors.

##### *House Trailer*

The house trailer quickly followed the invention of the automobile. The first trailers were hump-shaped and very small. Today there are trailers that have complete kitchens and showers and room for six people to sleep.

##### *Camper Truck*

Some children in the class may come from families who own a camper truck. Basically, it is a box-like structure placed in the bed of a pickup truck. It is compact and efficient as a "home away from home". The camper can be removed so that the truck can be used for other purposes.

##### *Camper Bus*

A major feature of this vehicle is that the occupants never have to go outside to get to their sleeping quarters. The driving section and the accommodation section are all part of one unit. Some families find that this is a very comfortable way to travel. Some families have made their own campers from school buses, but usually people buy the buses already converted to camper vehicles.

#### 2. Unusual Methods of Transportation

While we accept conventional ways of travelling as part of our daily lives, there are some less traditional methods of transportation that are unusual and exciting. Tell the children about some of these and show pictures of each of the vehicles in use, if possible.

##### *The Balloon*

A large basket that will hold about four people is attached to a huge balloon usually filled with helium, a gas that is lighter than air. The balloon is anchored to the ground with ropes. When the balloon is released, it rises with the air currents and floats through the sky. When the balloonists wish to return to earth, they slowly release the gas from the balloon to ensure a safe landing.

##### *The Unicycle*

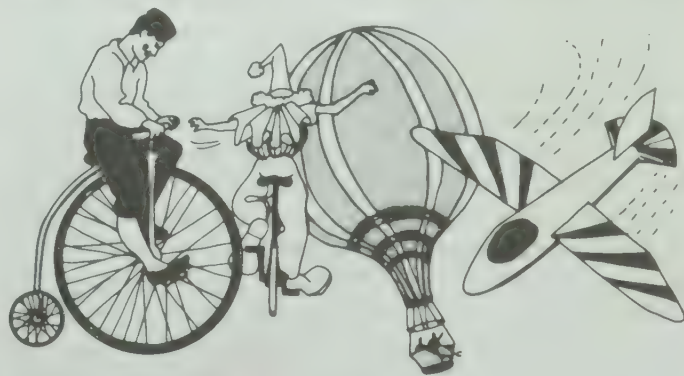
This close cousin of the bicycle has only one wheel. A seat is fastened above the wheel, but there are no handles, only pedals. The rider must steer the unicycle through body movements. The unicycle is often seen at the circus.

##### *The Penny-farthing*

The penny-farthing is another cousin of the bicycle. Like the bicycle the penny-farthing has two wheels, but the front wheel is very large and the back wheel is very small. The rider is at quite a height from the ground. Discuss why this type of bicycle is not popular today.

##### *The Glider*

Although the glider looks very much like an airplane, it has no engine. It glides because of air and wind currents. The glider pilot must have scientific knowledge about air currents and wind speeds. The pilot steers the glider by means of a rudder in the tail of the craft. Gliding is more popular as a hobby than as a method of transportation.



#### 3. The History of Transportation

Ask the children to share information that they have about travel in the past. Have each child choose and illustrate one method of travelling. Join the illustrations in sequence to make a pictorial time line of transportation. Complete the time line with the very modern forms of transportation that we use today.

You may wish to provide library books on transportation to be used for reference and to encourage reading.



#### 4. Traffic Safety

To maintain harmony between pedestrians and vehicles, certain safety rules must be observed.

Encourage the children to suggest traffic safety rules. If possible, have a traffic safety officer from the local police department visit the school and talk to the children.

List the traffic safety rules and discuss each carefully. You may wish to include the following:

- Fasten your seat belt as soon as you get into a car.
- Place toys or parcels on the floor of a car, not above the dashboard.
- If possible, cross a street at a stoplight or crosswalk.
- Play in parks or playgrounds, not on the streets.
- Always look carefully before you cross a street, even if there are traffic lights.
- Where there is no sidewalk, always walk on the left side of the road, facing oncoming traffic.

#### ART ACTIVITIES

##### 1. Constructing Vehicles

Three-dimensional models of different methods of transportation can be made from household discards. Have the children collect the following:

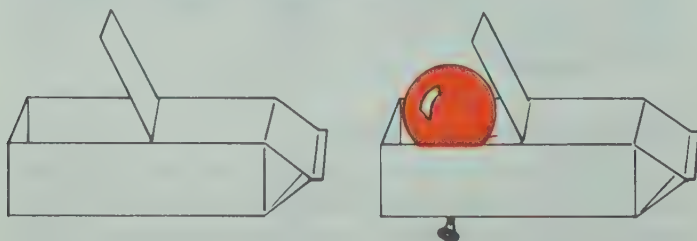
|                 |                |
|-----------------|----------------|
| small boxes     | scraps of wood |
| milk cartons    | balloons       |
| paper tubes     | bottle caps    |
| plastic bottles | buttons        |
| foil plates     | spools         |
| egg cartons     | string         |
| broken clocks   | wire           |

Have the children construct vehicles of their choice from these materials, joining the units with tape or white glue. The vehicles can be painted or parts can be covered with construction paper.

For models that really work, the children may enjoy making motor boats, sailboats, and airplanes as described below.

##### *Motorboats*

Obtain a large milk carton. Rinse it well and let it dry thoroughly. Starting from the bottom cut across the bottom and about halfway up each of the edges on the same side as the spout. Bend this rectangular section back to form a windshield. Punch a hole near the back of the bottom of the boat. Place a balloon in the boat and push the neck of the balloon through the hole in the bottom of the boat. Blow up the balloon, twist the neck closed, and hold it tightly with your fingers. Place the boat in a swimming pool or a tub of water and then release your hold on the neck of the balloon. The boat will be propelled forward by the force of the air escaping from the balloon.



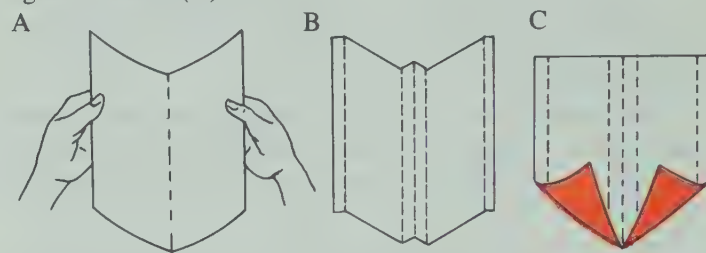
The children may enjoy making several of these boats and having boat races to see which "navigator" can make her/his boat travel the farthest.

##### *Sailboats*

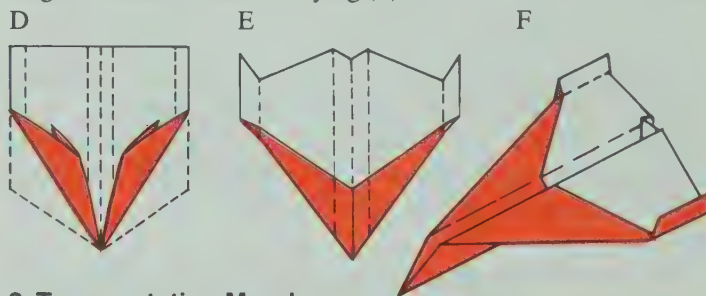
For these you will need bottle caps, halves of walnut shells, or jar covers to become the boats. Cut a sail for each boat from paper. Push a toothpick through the sail to serve as a mast. Fasten the mast to the bottom of the boat with a small lump of Plasticine. Place the boat in water and use a drinking straw to blow the sailboat forward.

##### *Airplanes*

All you need to make an airplane is a sheet of paper—any kind of paper will do. Fold the paper in half along the length of the sheet (A). Open it and on either side of the crease draw a line 2 cm from the crease. Then draw a line 3 cm from each long edge of the paper (B). Fold two corners as shown (C). Fold again as shown (D).



Fold the two wings *down* along the pencil marks beside the crease and the tips of the wings up along the pencil marks at the edges of the paper (E). Hold the airplane from underneath at the original crease and send it flying (F).



##### 2. Transportation Mural

Cut a piece of mural or kraft paper approximately two metres long. Paint a background to represent land, air, and water.

Refer to the list of methods of transportation. Have the children make the vehicles from colored construction paper. Pin or glue the vehicles on the appropriate part of the mural.

#### MOVEMENT ACTIVITIES

##### 1. Travelling on Foot

Each of us uses our feet for transportation every day. Have the children explore all the ways they can move by using their feet; for example, they can walk, run, hop, skip, jump, or slide. Make up relay races involving the different styles of travelling on foot.

#### MUSIC ACTIVITIES

##### 1. Travelling in Song

Make a book of the titles of poems and songs that mention a method of transportation. Add to the collection as children discover new titles. Use the following songs to start the collection.

- "Row Row Row Your Boat"
- "I've Been Working on the Railroad"
- "I Saw Three Ships"
- "Take Me for a Ride in Your Car"
- "Horses, Horses"







# Unit 7

Make a graph for your class.  
Show how the children come to school.

Answers will vary.



Show the number of children who come to school.  
Ring the greater number of each pair.

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| by  | by  | by  | by  | by  | on  |
|  |  |  |  |  |  |

How many more? \_\_\_\_ How many more? \_\_\_\_ How many more? \_\_\_\_

Making and interpreting a vertical bar graph

(one hundred twenty-nine) 129

## LESSON OUTCOME

Use information to complete a vertical bar graph; interpret the information shown in the graph

### Materials

poems or stories about animals and pets, large sheet of squared paper, small sheets of squared paper for individual graphs (optional)

### RELATED ACTIVITIES

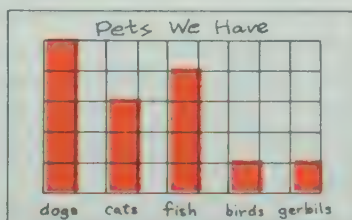
- Children may suggest other investigations the results of which they would like to graph. If you wish, divide the class into four or five groups so that each group conducts a different investigation.

## LESSON ACTIVITY

### Before Using the Page

• In preparation for this lesson read a story or a poem about pets. Discuss what kinds of pets children have. Make a list of kinds of pets on the chalkboard and have the children mark tallies under the headings to indicate which kinds they have at home. Have them count the tallies for each column.

| dog | cat | fish | bird |
|-----|-----|------|------|
| //  | //  | //   | /    |
| //  | /   | //   |      |
| /   |     |      |      |



Using a large sheet of squared paper, prepare the necessary titles and have children help to color the squares for each column of the graph. You may wish to distribute sheets of graph paper

and have the children prepare their own graphs at the same time. Afterward ask questions similar to the following:

- “How many children have dogs for pets?”
- “Do more children have fish or cats?”
- “How many more dogs than cats are there?”
- “What is the most popular kind of pet?”

### Using the Page

• Discuss the ways in which the children usually come to school each day. Have them help to tally the ways on the chalkboard, using the procedure outlined for the “Pets We Have” graph. You may prefer to label five containers for the five ways indicated on the graph for coming to school. Each child can drop one counter into the appropriate container. Have the children help to determine the number of counters in each container. Use the results to determine how many rectangles should be colored for each vertical bar. Ensure that the children begin coloring from the bottom of the graph. You may wish to have the children write numerals along the side of the graph to show the vertical scale.



# LESSON OUTCOME

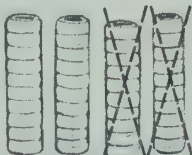
Subtract multiples of ten,  
minuends to 90

## Materials

objects for grouping by tens

## RELATED ACTIVITIES

- Prepare a work sheet as described on page T189.

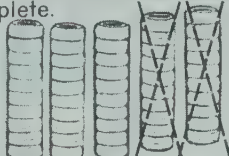


$$\begin{array}{r} 4 \text{ tens } 0 \text{ ones} \\ - 2 \text{ tens } 0 \text{ ones} \\ \hline 2 \text{ tens } 0 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 4    | 0    |
| - 2  | 0    |
| 2    | 0    |

$$\begin{array}{r} 40 \\ - 20 \\ \hline 20 \end{array}$$

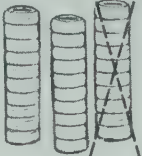
Complete.



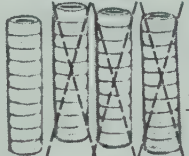
$$\begin{array}{r} 5 \text{ tens } 0 \text{ ones} \\ - 2 \text{ tens } 0 \text{ ones} \\ \hline 3 \text{ tens } 0 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 5    | 0    |
| - 2  | 0    |
| 3    | 0    |

$$\begin{array}{r} 50 \\ - 20 \\ \hline 30 \end{array}$$



$$\begin{array}{r} 30 \\ - 10 \\ \hline 20 \end{array}$$

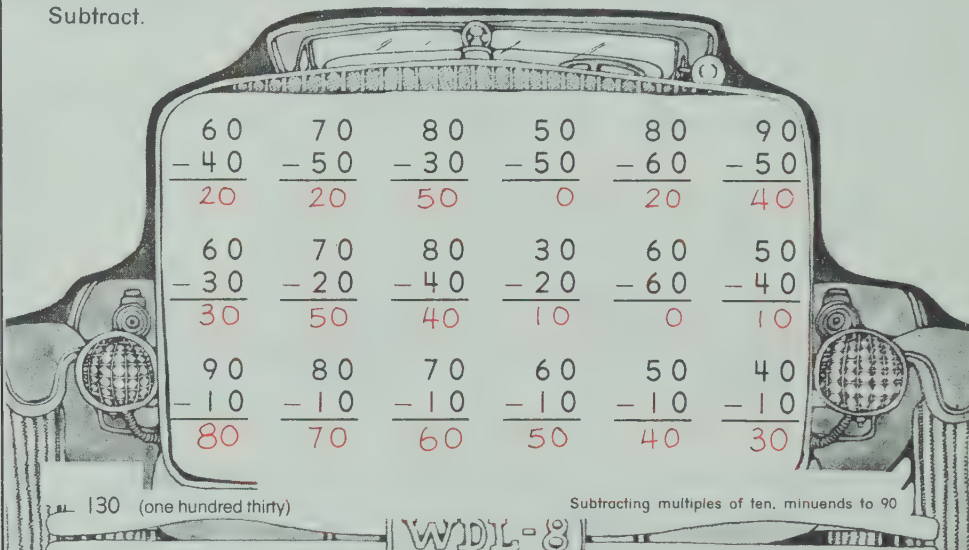


$$\begin{array}{r} 40 \\ - 30 \\ \hline 10 \end{array}$$

| tens | ones |
|------|------|
| 6    | 0    |
| - 2  | 0    |
| 4    | 0    |

| tens | ones |
|------|------|
| 7    | 0    |
| - 3  | 0    |
| 4    | 0    |

Subtract.



## LESSON ACTIVITY

### Before Using the Page

- Conduct a quick oral review of addition and subtraction facts having sums and minuends to 9, since a sound knowledge of these is necessary for adding and subtracting multiples of ten to 90.
- Review counting by tens from 10 to 90 and from 90 back to 10. Also, have the children count between limits. For example, start at 30 and count by tens to 80, or start at 70 and count back by tens to 20.
- Review the fact that each of the multiples of ten to 90 is equivalent to some tens and zero ones. State a number of tens and zero ones and have children state the number. Then reverse the procedure.
- Write these three exercises on the chalkboard.

$$\begin{array}{r} 30 \\ + 40 \\ \hline \end{array} \quad \begin{array}{r} 50 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 60 \\ - 20 \\ \hline \end{array}$$

Ask children to write the answers. Watch to see whether they notice what is different about the last exercise. If the child at the

chalkboard shows the correct answer, ask her/him to explain how the answer was obtained. If the answer is not correct or no answer is given, use objects for grouping by tens and proceed in the following way. Ask children to display 3 tens 0 ones and then 4 tens 0 ones to illustrate the sum of 30 and 40. Repeat for the second exercise. Have a child display 6 tens 0 ones for the third exercise. Point out the symbol  $-$  and ask what it shows. The children will likely suggest removing 2 tens 0 ones. Ask a child to do this and then to write the answer on the chalkboard.

- Write several subtraction exercises on the chalkboard. Have children illustrate the first two or three by using objects for grouping by tens. Write the answers. Ask the children to complete the remaining exercises on their own. Each child should have objects for grouping by tens.

### Using the Page

- Discuss the completed exercise with the children. Ask questions about the stacks of tires as the children complete the next three exercises. Then let them work independently, using groups of ten if necessary. Note that for  $60 - 60$ , only a zero in the ones' place is needed to show the answer.

**Light Bulbs**

2 tens 5 ones  
- 3 ones  
2 tens 2 ones

| tens | ones |
|------|------|
| 2    | 5    |
| -    | 3    |
| 2    | 2    |

25  
- 3  
22

**Complete.**

**Light Bulbs**

3 tens 4 ones  
- 2 ones  
3 tens 2 ones

| tens | ones |
|------|------|
| 3    | 4    |
| -    | 2    |
| 3    | 2    |

34  
- 2  
32

**Light Bulbs**

2 tens 4 ones  
- 4 ones  
2 tens 0 ones

| tens | ones |
|------|------|
| 2    | 4    |
| -    | 4    |
| 2    | 0    |

24  
- 4  
20

**Subtract.**

| tens | ones |
|------|------|
| 2    | 9    |
| -    | 6    |
| 2    | 3    |

29  
- 6  
23

| tens | ones |
|------|------|
| 3    | 7    |
| -    | 5    |
| 3    | 2    |

37  
- 5  
32

**Subtract.**

| tens | ones |
|------|------|
| 3    | 5    |
| -    | 2    |
| 3    | 3    |

35  
- 2  
33

| tens | ones |
|------|------|
| 6    | 4    |
| -    | 3    |
| 6    | 1    |

64  
- 3  
61

| tens | ones |
|------|------|
| 2    | 9    |
| -    | 8    |
| 2    | 1    |

29  
- 8  
21

| tens | ones |
|------|------|
| 1    | 5    |
| -    | 5    |
| 1    | 0    |

15  
- 5  
10

| tens | ones |
|------|------|
| 8    | 9    |
| -    | 5    |
| 8    | 4    |

89  
- 5  
84

| tens | ones |
|------|------|
| 4    | 6    |
| -    | 4    |
| 4    | 2    |

46  
- 4  
42

| tens | ones |
|------|------|
| 7    | 6    |
| -    | 3    |
| 7    | 3    |

76  
- 3  
73

| tens | ones |
|------|------|
| 6    | 3    |
| -    | 2    |
| 6    | 1    |

63  
- 2  
61

| tens | ones |
|------|------|
| 5    | 8    |
| -    | 7    |
| 5    | 1    |

58  
- 7  
51

| tens | ones |
|------|------|
| 9    | 6    |
| -    | 5    |
| 9    | 1    |

96  
- 5  
91

| tens | ones |
|------|------|
| 8    | 6    |
| -    | 6    |
| 8    | 0    |

86  
- 6  
80

| tens | ones |
|------|------|
| 4    | 9    |
| -    | 2    |
| 4    | 7    |

49  
- 2  
47

27 - 2 = 25  
27 - 3 = 24  
27 - 4 = 23  
27 - 5 = 22  
27 - 6 = 21

37 - 3 = 34  
37 - 4 = 33  
37 - 5 = 32  
37 - 6 = 31  
37 - 7 = 30

47 - 7 = 40  
47 - 6 = 41  
47 - 5 = 42  
47 - 4 = 43  
47 - 3 = 44

Subtracting one-digit numbers from two-digit numbers, no regrouping (one hundred thirty-one) 131

## LESSON OUTCOME

Subtract one-digit numbers from two-digit numbers, no regrouping, minuends to 99

## Materials

objects for grouping by tens,  
an abacus chart for each child,  
special work sheet (optional)

## RELATED ACTIVITIES

- Discuss the patterns formed in the last three sets of subtraction sentences. Children may say, "As one number goes up, the difference goes down," which, in a simple way, points out that as the number subtracted increases, the difference decreases (or vice versa). If children are interested in creating their own examples of patterns, start them off with examples such as  $29 - 9 = \underline{\quad}$ ,  $29 - 8 = \underline{\quad}$  and let them continue the pattern to  $29 - 1 = \underline{\quad}$ . This will ensure that no regrouping is encountered, but you may wish to let some of the more capable children continue the patterns for some examples as an investigation to precede regrouping; for example,  $34 - 1 = \underline{\quad}$ ,  $34 - 2 = \underline{\quad}$ ,  $34 - 3 = \underline{\quad}$ ,  $34 - 4 = \underline{\quad}$ , and so on.

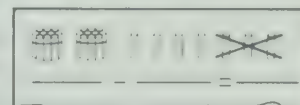
## LESSON ACTIVITY

## Before Using the Page

- Display 4 groups of ten and 8 ones. Write the numeral 48 on the chalkboard. Ask how many tens and how many ones there are and have a child show these in the appropriate columns of a chart on the chalkboard. Ask a child to remove some of the ones and write the numeral under the 8 in the ones' column of the chart. Remind the child to include the symbol - to indicate that these were taken away. Ask the children to tell you, if they can, how many tens and how many ones are left. Have a child verify the answer by counting them. Now review the procedure as you write the standard numerals in vertical form and ask, "What number is 4 tens 8 ones? How many were taken away? How many are left? What number is 48 minus (the number)?" Continue the procedure for other groups of ten and single ones.
- On the chalkboard, write exercises of the type shown on the page. Have children read each one. Ask how they would use their objects for grouping by tens to illustrate the first one. Have them do this using the objects and their abacus charts. Ask how

many tens and how many ones are left and what number this is. Have a child show the number on the chalkboard. Continue with other exercises.

- Prepare a work sheet of exercises, as shown, or draw diagrams on the chalkboard. Have the children suggest the corresponding subtraction sentences.



## Using the Page

- Have a child interpret the drawing for the first exercise by telling the story about how many packages of bulbs and how many single bulbs there are, how many are to be taken away, and how many bulbs are left. Let the children try the second exercise on their own and then discuss it in a manner similar to the first exercise. If this presents no difficulty, let the children work independently. Otherwise, discuss the next two or three exercises, having children display tens and ones to illustrate the numbers.



## LESSON OUTCOME

Subtract multiples of ten from two-digit numbers, minuends to 99

### Materials

objects for grouping by tens, an abacus chart for each child, special work sheet (optional)

## RELATED ACTIVITIES

- You may wish to have the children work in pairs using nine groups of ten and nine ones and an abacus chart. One child displays some tens and some ones and writes the number represented on paper. The partner removes some tens and writes the digits below those of the first numeral. One child writes the answer on the paper while the other checks by counting the tens and the ones remaining on the chart.

- Prepare work sheets of exercises to illustrate different number patterns.

$$\begin{array}{l} 6 - 4 = \underline{\quad} \quad 93 - 80 = \underline{\quad} \\ 16 - 4 = \underline{\quad} \quad 93 - 70 = \underline{\quad} \end{array}$$

$$96 - 4 = \underline{\quad} \quad 93 - 10 = \underline{\quad}$$

$$\begin{array}{l} 96 - 10 = \underline{\quad} \quad 98 - 40 = \underline{\quad} \\ 86 - 10 = \underline{\quad} \quad 88 - 40 = \underline{\quad} \end{array}$$

$$16 - 10 = \underline{\quad} \quad 48 - 40 = \underline{\quad}$$

$$\begin{array}{r} 4 \text{ tens } 4 \text{ ones} \\ - 2 \text{ tens } 0 \text{ ones} \\ \hline 2 \text{ tens } 4 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 4    | 4    |
| - 2  | 0    |
| 2 4  |      |

Complete

$$\begin{array}{r} 3 \text{ tens } 5 \text{ ones} \\ - 2 \text{ tens } 0 \text{ ones} \\ \hline 1 \text{ ten } 5 \text{ ones} \end{array}$$

$$\begin{array}{r} 3 \text{ tens } 2 \text{ ones} \\ - 1 \text{ ten } 0 \text{ ones} \\ \hline 2 \text{ tens } 2 \text{ ones} \end{array}$$

| tens | ones |
|------|------|
| 5    | 6    |
| - 3  | 0    |
| 2 6  |      |

| tens | ones |
|------|------|
| 6    | 3    |
| - 4  | 0    |
| 2 3  |      |

Subtract.

$$\begin{array}{r} 49 \\ - 30 \\ \hline 19 \end{array}$$

$$\begin{array}{r} 57 \\ - 40 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 71 \\ - 50 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 98 \\ - 20 \\ \hline 78 \end{array}$$

$$\begin{array}{r} 64 \\ - 60 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 53 \\ - 20 \\ \hline 33 \end{array}$$

$$\begin{array}{r} 82 \\ - 50 \\ \hline 32 \end{array}$$

$$\begin{array}{r} 75 \\ - 30 \\ \hline 45 \end{array}$$

$$\begin{array}{r} 46 \\ - 40 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 92 \\ - 50 \\ \hline 42 \end{array}$$

$$\begin{array}{r} 61 \\ - 20 \\ \hline 41 \end{array}$$

$$\begin{array}{r} 99 \\ - 30 \\ \hline 69 \end{array}$$

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| —  | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 95 | 75 | 65 | 55 | 45 | 35 | 25 | 15 |

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| —  | 70 | 60 | 50 | 40 | 30 | 20 | 10 |
| 87 | 17 | 27 | 37 | 47 | 57 | 67 | 77 |

132 (one hundred thirty-two)

Subtracting multiples of ten from two-digit numbers

## LESSON ACTIVITY

### Before Using the Page

- Write  $67 - 20$  in vertical form on the chalkboard. Have a child read the first number, represent the number using objects for grouping by tens, and state how many tens and how many ones there are. Have another child read the symbol  $-$  with the second number, tell what action is involved, and state how many tens and how many ones should be removed. Ask the child to remove them. Have a third child tell how many tens and how many ones are left, what number this is, and write the answer. Emphasize that no ones were removed, only tens. Repeat several times.

- Write several subtraction exercises on the chalkboard and have children use their objects for grouping by tens and their abacus charts to determine the answers. Each time point out that the number of tens changes, but the number of ones remains the same.

- Prepare a work sheet or draw diagrams on the chalkboard to show tens and ones with some tens crossed out to indicate they

are to be taken away. Have the children write the short form of subtraction for each illustration.

- Draw the following table on the chalkboard.

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| —  | 10 | 20 | 30 | 40 | 50 |
| 68 |    |    |    |    |    |

Show the children how to interpret it; for example, the first exercise is  $68 - 10$ . Have children complete the table. They may use their objects for grouping by tens, if necessary. Discuss the pattern resulting from the change in the tens' digit.

### Using the Page

- Have a child interpret the drawing for the first exercise, telling how many sets of ten tickets and how many single tickets there are, how many are to be taken away, and how many are left. Let the children try the next two exercises on their own and discuss them in a similar manner. Then let the children work independently.

T 172

# LESSON OUTCOME

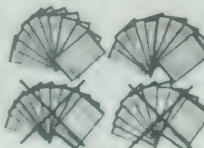
Subtract two-digit numbers,  
no regrouping, minuends to 99

## Materials

objects for grouping by tens, special  
work sheet (optional)

## RELATED ACTIVITIES

- Have the children work in pairs using nine groups of ten and nine ones and an abacus chart. One child displays some tens and some ones and writes the number represented on paper. The partner removes some tens and ones and writes the digits below those of the first numeral. One child writes the answer on the paper while the other checks by counting the tens and the ones remaining on the chart.



4 tens 6 ones

– 2 tens 3 ones

2 tens 3 ones

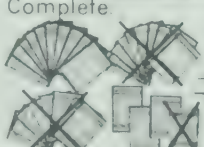
| tens | ones |
|------|------|
| 4    | 6    |
| – 2  | 3    |
| 2    | 3    |

4 6

– 2 3

2 3

Complete



3 tens 4 ones

– 2 tens 1 one


1 ten 3 ones

| tens | ones |
|------|------|
| 3    | 4    |
| – 2  | 1    |
| 1    | 3    |

3 4

– 2 1

1 3



2 tens 5 ones

– 1 ten 3 ones

1 ten 2 ones

| tens | ones |
|------|------|
| 2    | 5    |
| – 1  | 3    |
| 1    | 2    |

2 5

– 1 3

1 2

| tens | ones |
|------|------|
| 6    | 8    |
| – 2  | 4    |
| 4    | 4    |

6 8

– 2 4

4 4





| tens | ones |
|------|------|
| 6    | 7    |
| – 3  | 2    |
| 3    | 5    |

6 7

– 3 2

3 5

Subtract.

66

– 14

52

39

– 17

22

75

– 42

33

87

– 23

64

62

– 50

12

94

– 23

71

59

– 46

13

88

– 53

35

58

– 17

41

76

– 56

20

58

– 51

7

97

– 56

41

74

– 74

0

83

– 63

20

97

– 31

66

89

– 81

8

61

– 41

20

99

– 84

15

Subtracting two-digit numbers, no regrouping

(one hundred thirty-three) 133

## LESSON ACTIVITY

### Before Using the Page

- You may wish to start with a quick oral or written review of basic subtraction facts having minuends to 9.
- Write  $45 - 23$  in vertical form on the chalkboard. Have a child read it. Ask how many tens and how many ones there are for each number. Then have a child draw a vertical line to separate the tens from the ones. Have a child represent 45 using objects for grouping by tens. Remind the children of the symbol – and ask what should be done to subtract 23. Have a child demonstrate by removing tens and ones from the objects displayed. Ask the children if they know how many tens and ones should be left, and have a child verify this by counting those that remain. Ask what number this is and write it on the chalkboard. Review the procedure in the following manner: “Five ones take away three ones leaves two ones. Four tens take away two tens leaves two tens. Forty-five minus twenty-three equals twenty-two.”

Repeat the above procedure for other exercises. You may prefer to have all the children use objects for grouping.

- Prepare a work sheet showing tens and ones with some of each crossed out to indicate they are to be removed.



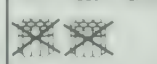

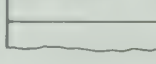
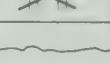
Have the children write the corresponding subtraction exercise in vertical form.

Depending on the ability of the children, you may wish to include a chart showing tens and ones in separate columns.

- Write four or five subtraction exercises on the chalkboard and encourage the children to try these without using objects for grouping.

### Using the Page

- Have a child interpret the drawing for the completed exercise, telling how many sets of ten tickets and how many single tickets there are, how many are to be taken away, and how many are left. Let the children try the next two exercises on their own and discuss them in a similar manner. Then let the children work independently.

|   |   |   |
|---|---|---|
|  |  |   |
|  |  |   |
|  |  |   |
|   |   | <div style="text-align: right;"> 5 8<br/>– 3 5<br/>2 3 </div> |



## LESSON OUTCOME

Subtract two-digit numbers,  
no regrouping, minuends to 99

## Materials

demonstration number line for  
0 to 100, matching number strips for  
1 to 10, a copy of page T333 and  
crayons for each child

## RELATED ACTIVITIES

- Use the exercises on the page and have the children create word problems to fit the situations. For example, for  $60 - 20 = 40$ , you might suggest, "There were 60 cookies in a cookie jar. Twenty cookies were eaten. Then 40 cookies were left." This kind of activity helps to reinforce the separation aspect of subtraction.

- Because it has been a while since a lesson has involved basic facts having sums to 18, this may be an opportune time to review them.

Prepare a work sheet for each child, showing three number lines as illustrated on page T189. It is important to scale the number lines as shown. Have the children follow the procedure on page T189 for using the work sheet. The work sheet is particularly useful because it can be used to review all the basic addition and subtraction facts.

- Have the children play the game "Find Our Difference" in groups of two to four players as described on page T189.

Subtract.

$$\begin{array}{r} 40 \\ - 30 \\ \hline 10 \end{array} \quad \begin{array}{r} 60 \\ - 20 \\ \hline 40 \end{array} \quad \begin{array}{r} 70 \\ - 40 \\ \hline 30 \end{array} \quad \begin{array}{r} 60 \\ - 60 \\ \hline 0 \end{array} \quad \begin{array}{r} 90 \\ - 70 \\ \hline 20 \end{array} \quad \begin{array}{r} 80 \\ - 10 \\ \hline 70 \end{array}$$

$$\begin{array}{r} 17 \\ - 2 \\ \hline 15 \end{array} \quad \begin{array}{r} 27 \\ - 2 \\ \hline 25 \end{array} \quad \begin{array}{r} 37 \\ - 2 \\ \hline 35 \end{array} \quad \begin{array}{r} 47 \\ - 2 \\ \hline 45 \end{array} \quad \begin{array}{r} 57 \\ - 2 \\ \hline 55 \end{array} \quad \begin{array}{r} 67 \\ - 2 \\ \hline 65 \end{array}$$

$$\begin{array}{r} 25 \\ - 3 \\ \hline 22 \end{array} \quad \begin{array}{r} 34 \\ - 4 \\ \hline 30 \end{array} \quad \begin{array}{r} 36 \\ - 4 \\ \hline 32 \end{array} \quad \begin{array}{r} 27 \\ - 7 \\ \hline 20 \end{array} \quad \begin{array}{r} 19 \\ - 0 \\ \hline 19 \end{array} \quad \begin{array}{r} 48 \\ - 4 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 55 \\ - 40 \\ \hline 15 \end{array} \quad \begin{array}{r} 21 \\ - 20 \\ \hline 1 \end{array} \quad \begin{array}{r} 53 \\ - 20 \\ \hline 33 \end{array} \quad \begin{array}{r} 96 \\ - 90 \\ \hline 6 \end{array} \quad \begin{array}{r} 58 \\ - 50 \\ \hline 8 \end{array} \quad \begin{array}{r} 84 \\ - 40 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 73 \\ - 33 \\ \hline 40 \end{array} \quad \begin{array}{r} 69 \\ - 56 \\ \hline 13 \end{array} \quad \begin{array}{r} 81 \\ - 81 \\ \hline 0 \end{array} \quad \begin{array}{r} 97 \\ - 82 \\ \hline 15 \end{array} \quad \begin{array}{r} 46 \\ - 33 \\ \hline 13 \end{array} \quad \begin{array}{r} 85 \\ - 35 \\ \hline 50 \end{array}$$

$$\begin{array}{r} 43 \\ - 31 \\ \hline 12 \end{array} \quad \begin{array}{r} 45 \\ - 33 \\ \hline 12 \end{array} \quad \begin{array}{r} 47 \\ - 35 \\ \hline 12 \end{array} \quad \begin{array}{r} 49 \\ - 37 \\ \hline 12 \end{array} \quad \begin{array}{r} 59 \\ - 47 \\ \hline 12 \end{array} \quad \begin{array}{r} 69 \\ - 57 \\ \hline 12 \end{array}$$

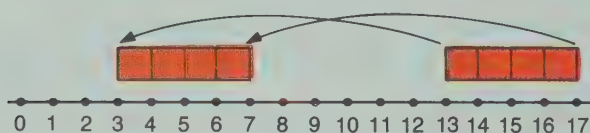
134 (one hundred thirty-four)

Subtraction practice: minuends to 99

## LESSON ACTIVITY

## Before Using the Page

- Review subtraction of two-digit numbers choosing procedures from those described on pages T170 to T173.
- Use the demonstration number line for 0 to 100 and matching number strips for 1 to 10 to illustrate patterns in subtraction. For example, use the four-strip to demonstrate the pattern when 4 is subtracted from a number that ends in 7. (See page T157.)



$$17 - 4 = 13$$

$$7 - 4 = 3$$

- Give each child a copy of the number chart on page T333. Have them color the square for a certain two-digit number and then use the same color in the square for the number that is 10

less than the given number. Repeat for several examples, changing the color for each pair of numbers. You may wish to extend this activity by having children color the square for the number that is 20 less, 30 less, 40 less, and so on, than a certain number. The pattern revealed in columns will help to reinforce the concept of subtracting a multiple of ten from a two-digit number.

## Using the Page

- Let the children work independently on this page. As they complete the exercises in the first five rockets, they will be reviewing the steps presented in the development of subtracting two-digit numbers on pages 130 to 133. While the children are working, note those who are having difficulty. Determine whether the difficulty is a result of poor recall of subtraction facts or a lack of understanding of two-place numerals as tens and ones.

- After the children have completed the page, ask them what they notice about the differences in the last rocket. Then ask what pattern there is in the numbers being subtracted. Some children may be interested in creating similar sets of exercises that give constant differences.

## LESSON OUTCOME

Subtract amounts of money, no regrouping, minuends to 99 cents

## Materials

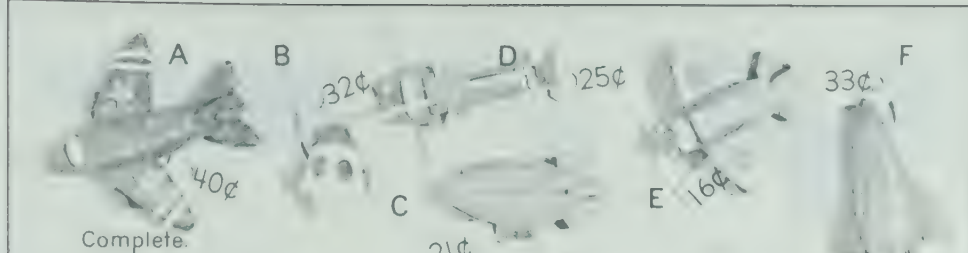
real money, play money, or coin cutouts from copies of page T327, objects having prices from 40¢ to 99¢, cards showing amounts of money to 99¢, a sheet of paper for each child, play store or store chart

## Vocabulary

airplane, space module, airship, helicopter, biplane, rocket

## RELATED ACTIVITIES

- After the children have completed the page, discuss which objects were chosen for the last two problems and how much money was left after each purchase. For the last problem in the second column, ask if anyone chose to buy two objects or if anyone can find two objects that could be bought with 37¢, and how much change there would be (C and E, 0¢).
- Have children engage in activities involving the play store or the store chart.



Complete.

|                          |                          |
|--------------------------|--------------------------|
| I have 27¢.              | I have 46¢.              |
| I buy C for <u>21</u> ¢. | I buy B for <u>32</u> ¢. |
| I have <u>6</u> ¢ left.  | I have <u>14</u> ¢ left. |
| I have 86¢.              | I have 67¢.              |
| I buy D for <u>25</u> ¢. | I buy A for <u>40</u> ¢. |
| I have <u>61</u> ¢ left. | I have <u>27</u> ¢ left. |
| I have 96¢.              | I have 33¢.              |
| I buy E for <u>16</u> ¢. | I buy F for <u>33</u> ¢. |
| I have <u>80</u> ¢ left. | I have <u>0</u> ¢ left.  |
| I have 55¢.              | I have 49¢.              |
| I buy D for <u>25</u> ¢. | I buy E for <u>16</u> ¢. |
| I have <u>30</u> ¢ left. | I have <u>33</u> ¢ left. |

Answers will vary.

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| I have 29¢.                       | I have 37¢.                       |
| What can I buy?                   | What can I buy?                   |
| <u>C or D or E</u>                | <u>B or C or D or E or F</u>      |
| I will have <u>      </u> ¢ left. | I will have <u>      </u> ¢ left. |

Subtracting with money, amounts to 99 cents (one hundred thirty-five) 135

## LESSON ACTIVITY

## Before Using the Page

- Display coins for amounts to 99 cents. Review how to begin counting with the coins of greatest value first, when determining the total amount of money. For five dimes and three pennies, for example, the counting would be 10, 20, 30, 40, 50, 51, 52, 53.
- Display objects from the play store having prices from 40¢ to 99¢. Display six dimes and seven pennies. Have a child count aloud and determine the amount of money. Choose an object with a tag showing a price of 35¢. Ask how much the object costs and whether the child has enough money to buy it. Ask how the child could find out how much money would be left after buying the object. If children suggest removing coins worth 35 cents from the set, have them do this and count to find the amount of money that remains. Then, if no child suggests it, write 67¢ and 35¢ as a subtraction exercise in vertical form and have the children determine the answer. Repeat the procedure for different amounts.
- Give each child a sheet of paper and some dimes and pennies. Display a card showing an amount of money, for example, 78¢.

Have children write the numeral and then represent the amount using their coins. Display an object with a tag showing a price of 42¢. Have the children write this numeral under the first one. Then have them determine the amount of money left over, first by subtracting and then by using their coins. Repeat for different amounts.

## Using the Page

- Have the children identify the objects and their prices. Ask a child to read the first problem. Discuss how a letter is used to refer to each object pictured. Discuss the second problem with the children and have them complete it. Then have a child read the last problem in the first column. Discuss the way in which this problem differs from the first two problems. Ask, "Could you buy A? Why not?" Consider the other objects in order and ask similar questions. Tell the children that they are to choose the one they prefer to buy, if there is enough money.



## LESSON OUTCOME

Recognize one-third of a whole or a set; use the symbol  $\frac{1}{3}$

### Materials

paper shapes marked to show halves, thirds, fourths, and unequal parts, scissors, paste, display board and cutouts, yarn or string

### Vocabulary

one-third, thirds

## RELATED ACTIVITIES

- Prepare bags containing different numbers of objects. Place each bag in a small tray or box. Attach a card showing the symbols  $\frac{1}{2}$ ,  $\frac{1}{3}$ , or  $\frac{1}{4}$  to each tray. Have the children find that part of the total number of objects and place them in the tray. The rest should be returned to the bag. Two cards may be used with some trays; for example,  $\frac{1}{2}$  and  $\frac{1}{3}$  may be used with six objects.

1 red part  
3 equal parts

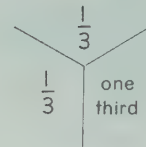


$\frac{1}{3}$  is red.

1 blue part  
3 equal parts

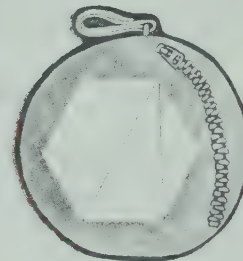
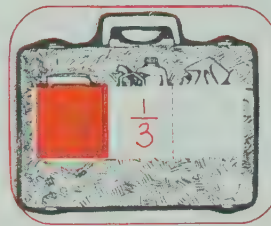
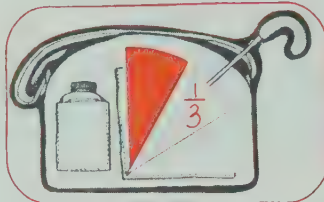


$\frac{1}{3}$  is blue.

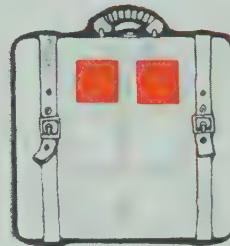
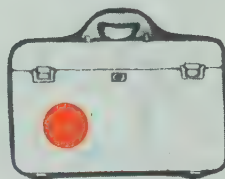


Ring each picture that shows thirds.

Color one third. Print  $\frac{1}{3}$  on one third.



Color one-third of each set.



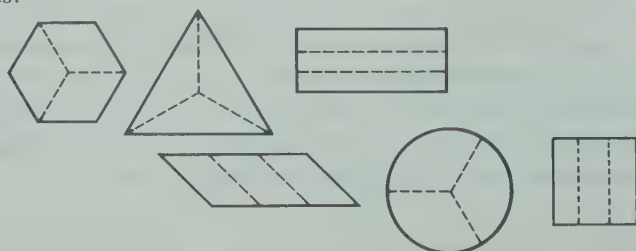
136 (one hundred thirty-six)

Introduction to the symbol  $\frac{1}{3}$

## LESSON ACTIVITY

### Before Using the Page

- Review the concepts of halves and fourths. Display various paper shapes, some marked into halves, some into fourths, and others into parts that are not equal. Have the children identify those showing halves and fourths. Ask why other shapes marked into four parts do not show fourths. (The parts are not equal.) Review how to print the symbols  $\frac{1}{2}$  and  $\frac{1}{4}$ .
- Have prepared, in advance, different shapes marked into thirds.



Display one shape and say, "If I cut this shape along the broken lines, how many parts will there be?" Ask the children if they

think the parts will be equal. Have a child cut the shape and demonstrate that the parts match. Hold up one part and emphasize that this is one of the three equal parts of the shape. Introduce the term *one-third* and print it on the chalkboard. Print the symbol  $\frac{1}{3}$  on each of the three equal parts of the shape.

Distribute the different shapes marked into thirds. Have the children cut the shapes and match the three parts to check that they are equal. Then have them paste the parts on a sheet of paper to form the original shape. Have the children color one of the thirds and print  $\frac{1}{3}$  on another third.

- Display paper shapes marked into three unequal parts. Ask whether the shapes show thirds and have children state the reason.
- Adapt the display-board activities suggested on page T149, to demonstrate one-third of a set of from 3 to 12 members.

### Using the Page

- Discuss the drawings at the top of the page. You may wish to have the children color one third of the square blue and one third of the rectangle yellow.

Read the instructions for the exercises and discuss the procedure. Then let the children work independently.

## LESSON OUTCOME

Identify halves, thirds, and fourths

## Materials

display board, shapes that show halves, thirds, and fourths

## Vocabulary

two-thirds, two-fourths, three-fourths

## RELATED ACTIVITIES

- You may wish to have the children work in pairs using flash cards showing pictures of fractional parts. If the symbols and the words for the fractions are written on the backs of the cards, the child who shows the card to the partner will be able to see the answer and determine whether the partner's answer is correct.

Ring the fraction that tells how much is red

Identifying halves, thirds and fourths

(one hundred thirty-seven) 137

## LESSON ACTIVITY

## Before Using the Page

- Display three shapes cut into parts as shown.



Have the children first identify the three shapes. Ask which shape shows thirds. Have a child verify that the three parts are equal by placing one on top of another. Then have the child reassemble the parts to show the whole shape. Ask which shape shows halves and repeat the procedure. Ask what kind of parts are shown by the third shape and repeat the procedure.

- Play the game "Tell Me" in reference to the shapes on the display board. Ask the children to close their eyes while you remove one part of a shape. Have the children identify which piece is missing. Have them say, for example, "You have one-fourth of the square shape." The child who guesses correctly

may place the piece where it belongs. At some point in this game, remove two-thirds of the triangular shape. After the children have had an opportunity to express in their own words which parts are missing, introduce the term *two-thirds*. Continue the game, removing parts such as two-fourths, three-fourths, and, if you wish, four-fourths. Introduce the new terms as they occur.

Review the new terms and introduce new symbols in the following manner. Ask how many equal parts there are for the square. Ask what one part is called and write the symbol  $\frac{1}{4}$  on the chalkboard. Ask a child to show one-fourth of the square. Ask what name is given to two of the equal parts and write  $\frac{2}{4}$  on the chalkboard. Have a child show two-fourths of the square. Continue for three-fourths and four-fourths. Then discuss thirds in relation to the triangle and halves in relation to the circle.

## Using the Page

- Discuss the shapes at the top of the page, reviewing how each symbol is related to the corresponding shape. Let the children work independently once they understand that they are to ring the fraction that tells how much of each shape is red.



- T 178

## LESSON OUTCOME

Show from one-tenth to nine-tenths of a whole

## Materials

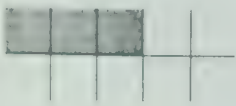
display board, shapes that show tenths, paper strips having the same length and marked to show halves, thirds, fourths, and tenths, flash cards for the fraction names *one-tenth* to *nine-tenths*, flash cards for the symbols  $\frac{1}{10}$  to  $\frac{9}{10}$

## Vocabulary


the fraction names *one-tenth* to *nine-tenths*

## RELATED ACTIVITIES

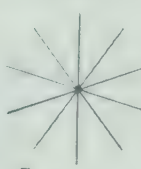
- If the children prepared the fraction booklets described on page T178, you may wish to have them extend the booklets to include tenths.
- After the page has been completed, you may wish to discuss how tenths can be shown with decimals. The children could then write the decimals 0.1, 0.2, 0.3, and so on, beside the fractions at the right.








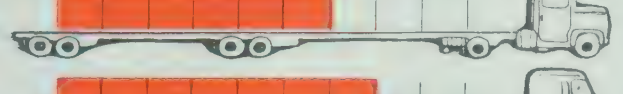
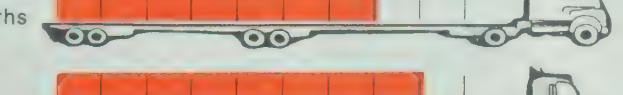
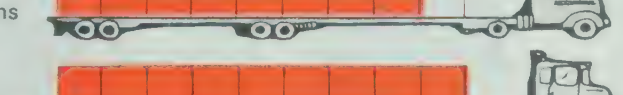

$\frac{3}{10}$  is red.



$\frac{5}{10}$  is blue.



$\frac{7}{10}$  is green.

| Color.       |   | Write the fraction. |
|--------------|---|---------------------|
| one tenth    |    | $\frac{1}{10}$      |
| two tenths   |    | $\frac{2}{10}$      |
| three tenths |    | $\frac{3}{10}$      |
| four tenths  |    | $\frac{4}{10}$      |
| five tenths  |    | $\frac{5}{10}$      |
| six tenths   |    | $\frac{6}{10}$      |
| seven tenths |   | $\frac{7}{10}$      |
| eight tenths |  | $\frac{8}{10}$      |
| nine tenths  |  | $\frac{9}{10}$      |

Representing tenths
(one hundred thirty-nine) 139

## LESSON ACTIVITY

## Before Using the Page

- Display various shapes that show tenths. Have children check that there are ten parts for each shape and that the parts for each shape are equal. Ask what name is given to one of the ten equal parts. Have a child write  $\frac{1}{10}$  on the chalkboard. Review the significance of the 1 and the 10 in the symbol. Write the fraction name "one-tenth" beside the symbol.
- Cut strips of paper having the same length. Mark one side of each of the strips to show halves, thirds, fourths, or tenths. Color a fractional part of each of the strips, but leave some of the strips for tenths uncolored for a later activity. Display the strips so that the marked sides cannot be seen. Turn over the strip that shows halves. Ask the children to



state whether the strip shows halves, thirds, fourths, or tenths and then state the fraction that tells how much of each strip is colored. For example, a child might say, "The strip shows halves, and one half is colored." Have a child select one of the strips to be turned over and repeat the procedure. Have children take turns selecting strips until all of them have been turned over and discussed. Each time a strip showing tenths is exposed, write on the chalkboard the fraction that tells how many tenths are colored. Write the fraction name beside the symbol.

- Display the uncolored strips for tenths prepared earlier. Have children help to color them to show tenths. By selecting those not used in the preceding activity it is possible to complete the sequence from  $\frac{1}{10}$  to  $\frac{9}{10}$  or  $\frac{10}{10}$ . Since these have been discussed in no particular order, the strips should now be removed from the display board and placed in the proper sequence.

- Use flash cards for the fraction names *one-tenth* to *nine-tenths* or *ten-tenths*. Have children write the corresponding fractions.

## Using the Page

- Discuss the diagrams at the top of the page. Read and discuss the instructions. Then let the children work independently.



# LESSON OUTCOME

Use the decimetre as a unit of length

## Materials

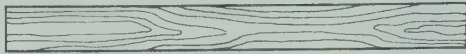
a decimetre strip for each child,  
unmarked metre sticks, tape, string,  
scissors, various bottles, cans, and jars

## Vocabulary

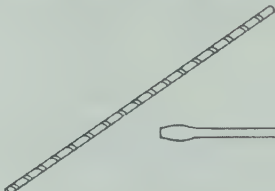

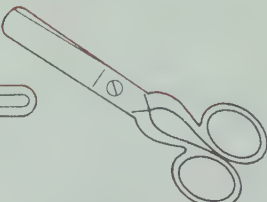
decimetre

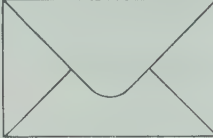
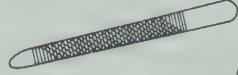

## RELATED ACTIVITIES

- Have the children cut strips of paper to match various body measurements, for example, from the elbow to the tip of the middle finger. Have the children determine the number of decimetres that fit each of these.

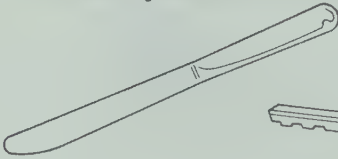




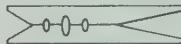
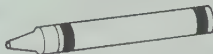
Check the objects that are longer than the decimetre strip.  
*Answers will vary.*






Check the objects that are shorter than the decimetre strip.







Use your decimetre strip to measure.




about \_\_\_\_ strips




about \_\_\_\_ strips




about \_\_\_\_ strips



about \_\_\_\_ strips



about \_\_\_\_ strips



about \_\_\_\_ strips

140 (one hundred forty)

Using the decimetre as a unit of length

## LESSON ACTIVITY

### Before Using the Page

- Prepare, in advance, strips of cardboard one decimetre long, or use copies of page T339. There should be one for each child and several extra strips. Have children determine how many decimetre strips will fit an unmarked metre stick by taping the strips end to end to the metre stick. Discuss the fact that ten strips match the length of the metre stick and that each strip is one-tenth of the length of the metre stick. Introduce the word *decimetre* and discuss the fact that it is suitable for measuring lengths shorter than one metre.
- Have the children compare their strips with the lengths of several objects on display in the classroom. Have them state the length of each object as being “shorter than the decimetre strip”, “longer than the decimetre strip”, or “about the same length as the decimetre strip”.
- Give each child a piece of string one decimetre long. Have the children check the length of the string with their decimetre strip. Have them use the string to determine whether the distance around various bottles, cans, jars, their wrist, their ankle, and so

on, is longer than, shorter than, or about the same length as one decimetre.

- On the chalkboard, draw line segments measuring an exact number of decimetres. Have children place their decimetre strips end to end along the line segments and state how many decimetre strips are needed to match the line segments. Repeat for line segments that are not an exact number of decimetres in length. Have children decide whether each length is closer to one number of strips or to the next number of strips and express the length as “about \_\_\_\_ strips”.
- Have two children together demonstrate how to measure the length of your desk by alternately placing their strips along the edge of the desk and counting. It will likely be necessary for them to round their measurement to “about \_\_\_\_ strips”.

### Using the Page

- Provide the objects shown for the children to compare their lengths with the decimetre strip. For the last part of the page, have the children use their decimetre strips to measure various lengths in the classroom. You may wish to have the children work in pairs for this part of the page.

# LESSON OUTCOME

Identify sets of hundreds, to 900

## Materials

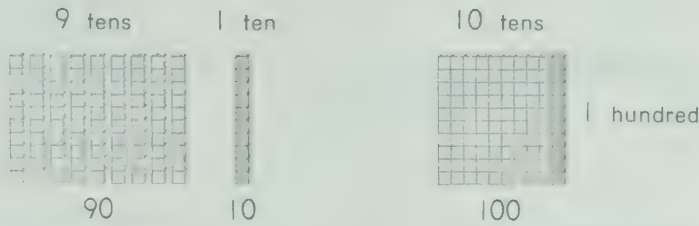
objects for grouping by tens, Base Ten Blocks or models for tens and hundreds made from copies of page T336 pasted on Bristol board

## Vocabulary

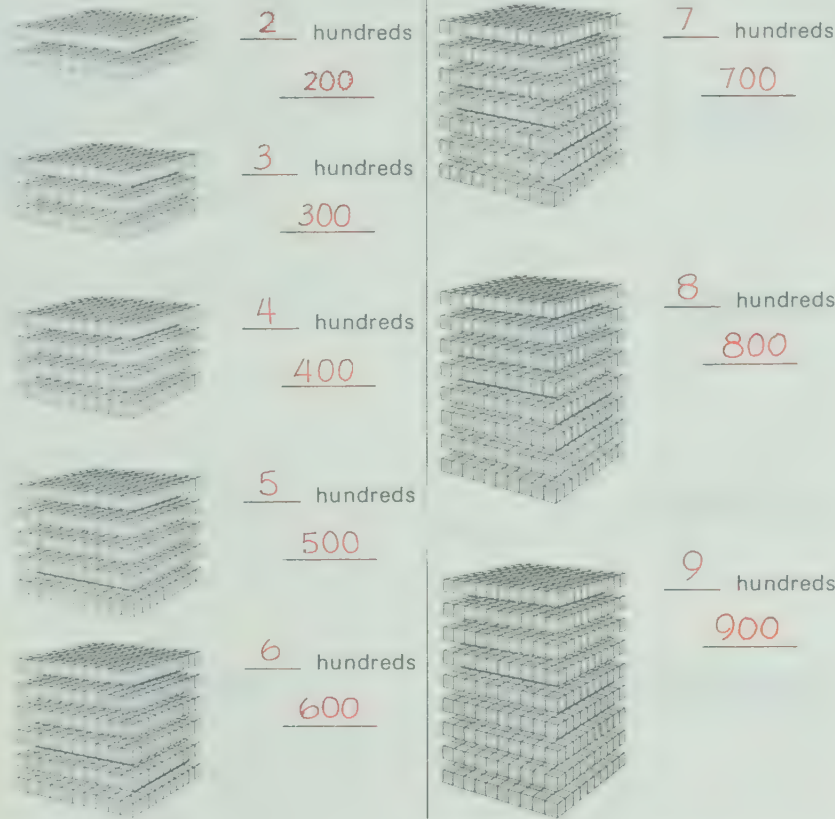
the number names *one hundred* to *nine hundred*

## RELATED ACTIVITIES

- This activity will help children to develop an awareness of *one hundred*. Give each of ten children ten Pop-it beads and have them join the beads to make strings of ten. Then ask the children to join the tens to make one long string of one hundred beads. Have the children count the beads by tens.



Complete



Introduction to hundreds, to 900

(one hundred forty-one) 141

## LESSON ACTIVITY

### Before Using the Page

- Have the children count by tens from 10 to 100.
- Have the children work in small groups. Give each group a box of objects for grouping by tens. Each box should contain exactly one hundred objects, but do not tell the children this. Let the children decide how to count the objects. If some groups do not group the objects by tens at the start, have them do so after they have reported the total number of objects. Ask each group to state the total number of objects. Ask them to state how many groups of ten there are. Then ask them to make one group of the ten groups of ten. Children need to experience this step to help them develop an awareness of *one hundred*.

Have one group display their bundle of one hundred. Begin a chart on the chalkboard and write "1 hundred". Have a child show another way to write "1 hundred" in the second column.

|            |     |
|------------|-----|
| 1 hundred  | 100 |
| 2 hundreds | 200 |
| 3 hundreds | 300 |

Have groups, in turn, place their bundles of one hundred beside those already there. Each time, ask the children, "How many hundreds are there now?" Write the words and the numerals in the chart each time, until you reach 900.

- Review the fact that 10 tens have the same value as 1 hundred. Use Base Ten Blocks (longs and flats), or prepare models for tens and hundreds from copies of page T336 pasted on Bristol board. Give each child ten of the models of ten. Have the children arrange them to form a model of one hundred as they count by tens to 100. Have the children exchange their models of ten tens for a model of one hundred.
- Display models of one hundred and have the children tell how many there are. Then reverse the procedure. State a number of hundreds (to 900) and have children display the models and write the corresponding numeral on the chalkboard.

### Using the Page

- Refer to the diagram at the top of the page to review the fact that 10 tens have the same value as 1 hundred. Discuss the illustration for 200, and then let the children work independently.



## LESSON OUTCOME

Identify a set of hundreds, a set of tens, and a set of ones and write the corresponding three-place numeral, numbers to 199

## Materials

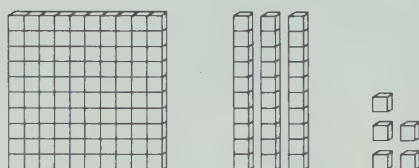
models for tens

## Vocabulary

the number names *one hundred one* to *one hundred ninety-nine*

## RELATED ACTIVITIES

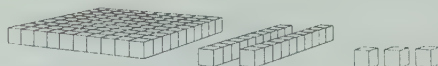
- You may wish to have the children work in pairs using a model of one hundred, nine models of tens, and nine models of ones. One child displays the model of one hundred and some models of tens and ones. The partner writes the number of each and then the standard numeral.



| hundreds | tens | ones |
|----------|------|------|
| 1        | 3    | 5    |

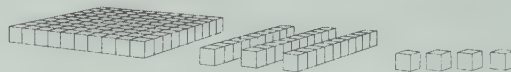
135

Complete.



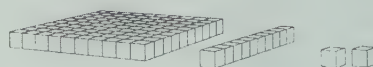
| hundreds | tens | ones |
|----------|------|------|
| 1        | 2    | 3    |

123



| hundreds | tens | ones |
|----------|------|------|
| 1        | 3    | 4    |

134



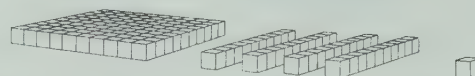
| hundreds | tens | ones |
|----------|------|------|
| 1        | 1    | 2    |

112



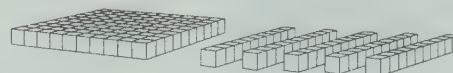
| hundreds | tens | ones |
|----------|------|------|
| 1        | 0    | 5    |

105



| hundreds | tens | ones |
|----------|------|------|
| 1        | 4    | 1    |

141



| hundreds | tens | ones |
|----------|------|------|
| 1        | 5    | 0    |

150

142 (one hundred forty-two)

Representing numbers to 199 using hundreds, tens, and ones

## LESSON ACTIVITY

## Before Using the Page

- Display ten models of ten. Have children count by tens to one hundred as you point to each group of ten in turn. Ask what could replace the ten models of ten. Have a child remove the ten models of ten and replace them with a model of one hundred. Emphasize that ten tens have the same value as one hundred.
- On the chalkboard, draw a place-value chart with three columns labelled as shown. Display six tens and ask what number is shown (60). Place four ones with the tens and ask what number is shown now (64). Place one hundred with the tens and ones. Ask how many hundreds there are and show this in the chart. Ask how many tens there are and how many ones there are. Show these in the chart. As you write the numeral in

| hundreds | tens | ones |
|----------|------|------|
| 1        | 6    | 4    |
| 1        | 2    | 7    |
| 1        | 8    | 4    |

standard form (164), have the children read it as “one hundred sixty-four”. Note that the word “and” is not used after “hundred”.

Repeat the procedure to obtain such numerals as 127, 184, 116, 133, and finally some for which there are zero tens or zero ones as in 106 and 130.

- Reverse the procedure of the preceding activity. Write the standard numeral first. Have children identify the ones' digit, the tens' digit, and the hundreds' digit. Write these in their proper places in the chart. Then have the children use models to represent the number, and then state it.

## Using the Page

- Summarize the preliminary activities by discussing the completed exercise with the children. Ask how many hundreds there are. Have children trace over the dotted 1. Repeat for the number of tens and the number of ones. Have the children read the standard numeral and trace over it. Then let the children work independently.

Complete.

|     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 |
| 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 |
| 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 |
| 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 |
| 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 |
| 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 |
| 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 |
| 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 |
| 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 |
| 200 |     |     |     |     |     |     |     |     |     |

Count by ones.

157 158 159 160 161 162 163 164 165 166

Count by tens.

100 110 120 130 140 150 160 170 180 190  
 114 124 134 144 154 164 174 184 194 204

Writing numerals to 200

(one hundred forty-three) 143

## LESSON OUTCOME

Write numerals in sequence for the numbers from 100 to 200

## Materials

a number chart for 1 to 100, a blank number chart or a blank number board and tags for the numbers from 101 to 200

## RELATED ACTIVITIES

- You may wish to give each child a copy of the blank chart on page T335. Have the children write numerals in rows or columns according to instructions; for example, "Show all the numerals in the column that starts with 105." After the chart has been completed, you may wish to have the children color certain patterns, for example, all the numerals that have 2 in the ones' place.
- Before this time, many children will have noticed that each page of *Starting Points in Mathematics 2* shows both the standard numeral and the word name for the page number. Draw attention to this fact now and have the children read the word name shown at the bottom of page 143. Point out the use of the hyphen in the word name. Have the children read and discuss with them the word names for other page numbers to 199. This activity will help children to read standard numerals for numbers.

## LESSON ACTIVITY

## Before Using the Page

- Display a number chart for 1 to 100. Have the children count by tens from 10 to 100 while a child points to the numerals in the chart. Have the children start at 90 and count by ones to 100 as a child points to the numerals. Ask what number is one greater than 99.
- Display a blank number board or a blank number chart. Ask what number is one greater than 100. Write the numeral 101 in the first square of the chart. Ask what number is one greater than 101 and write the numeral in the chart. Continue in this manner to 110. Have the children rote count from 101 to 110 as a child points to the numerals in the chart. Compare the numerals 101 to 110 with the numerals 1 to 10 in the first chart.

Use a similar procedure for showing the numerals 111 to 120, 121 to 130, and so on, to 200. Compare each row of this number chart with the corresponding row of the chart for 1 to 100.

- Have the children refer to the two number charts from the preceding activities. Ask a child to point to the numeral 64 and then to the numeral 164. Repeat for other pairs of numerals.

- State numbers at random and have children point to the numerals. Then reverse the procedure; that is, point to a numeral and have a child state the corresponding number.
- Have the children count within limits; for example, have them count by ones from 31 to 40. Then have them count by ones from 131 to 140. Have the children count by tens from 10 to 100 as you point to the numerals. Then have them count by tens from 110 to 200 while you point to the numerals. Now vary the starting number, but continue to have them count by tens while you point to the numerals; for example, from 6 to 96 and then from 106 to 196, from 2 to 92 and then from 102 to 192.
- State a number between 100 and 200. Have the children write the numeral. Repeat for several numbers.

## Using the Page

- Discuss how the children are to write the missing numerals in the chart. After they have completed the chart, have them refer to it to complete the three patterns at the bottom of the page. Note that in the third pattern they are challenged to go beyond 200 to obtain the last number.



## LESSON OUTCOME

Determine the values of sets of coins, to 99 cents

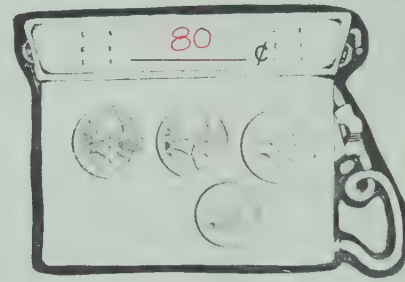
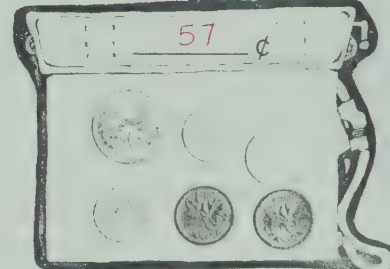
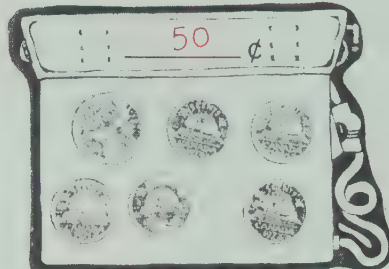
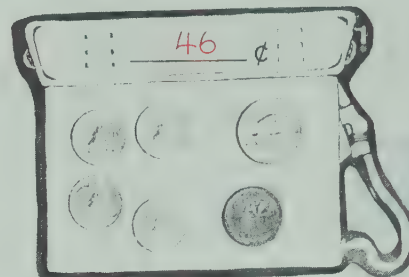
### Materials

number chart for 1 to 100, real money, play money, or coin cutouts from copies of page T327, objects having tags showing prices to 99¢

## RELATED ACTIVITIES

- Prepare work sheets or cards on which pairs of sets of coins are shown. Have the children mark the set of coins in each pair that has the greater (lesser) value. Coin cutouts from copies of page T327 may be used to prepare the sets.

How much?



144 (one hundred forty-four)

Recording values of sets of coins, to 99 cents

## LESSON ACTIVITY

### Before Using the Page

- Display a number chart for 1 to 100. Ask a child to write the numeral 25 on the chalkboard. Have another child use the number chart and find the number that is 25 greater by starting at 25 and counting by ones. Because children are now familiar with the procedure of moving vertically on the number chart to obtain a number ten greater than or ten less than a given number, have a child find the number that is 10 greater than 25, then the number that is 10 greater than 35, and then the number that is 5 greater than 45. Continue the procedure to obtain the sequence of numbers 25, 50, 75, 100. Have children practise counting by twenty-fives to 100.

- Display a quarter, a dime, a nickel, and a penny. Have children identify each coin by name and state its value. Display nine nickels and have children count by fives to 45. Display nine dimes and have children count by tens to 90. Display one quarter and ask how much money there is. Place another quarter beside the first one and ask how much money there is now. Place a third quarter with the others and repeat the question.

- Display sets of coins having values to 99 cents and have children determine the amounts of money. Begin first with easier sets such as four dimes and three pennies, and gradually include some of each of the four kinds of coins. Review the procedure of beginning with the coins of greatest value and then considering coins in order of decreasing values.

- Display an object with a tag showing a price of, say, 62¢. Have the children determine what coins could be used for the exact amount needed to pay for the object. Discuss different ways of selecting coins having a value of 62¢.

- Write amounts of money on the chalkboard (42¢, 45¢, 60¢, 78¢). Have the children use coins to represent these amounts. Since there will be different ways of choosing coins for these amounts, each child's answer should be discussed. Then you may wish to ask which set of coins has the fewest coins for each amount.

### Using the Page

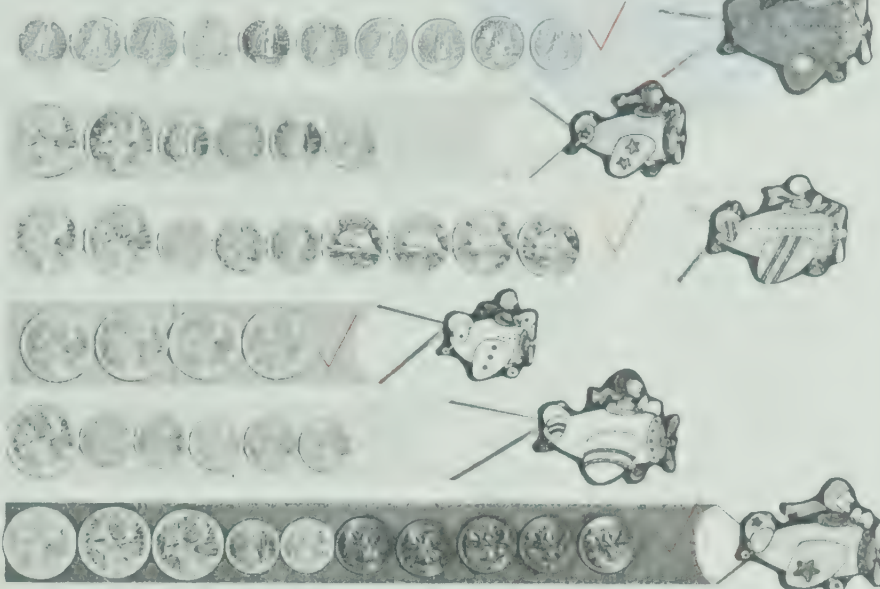
- Remind the children to begin counting the coins of greatest value first. Then let them work independently.



one dollar

100 cents

Check the sets of coins that have the value of one dollar.



How many of each coin do you need for one dollar?

|    |          |     |         |
|----|----------|-----|---------|
| 4  | quarters | 20  | nickels |
| 10 | dimes    | 100 | pennies |



Identifying sets of coins having the value of one dollar

(one hundred forty-five) 145

## LESSON OUTCOME

Identify sets of coins having the value of one dollar

## Materials

a one-dollar bill, real money, play money, or coin cutouts from copies of page T327

## Vocabulary

one dollar

## RELATED ACTIVITIES

- Have children use the play store to buy items having prices of one dollar. They should pay for each item using a set of coins having a value of one dollar.
- Have the children cut pictures from newspapers and catalogues of items that cost about one dollar. They can paste the pictures in a booklet entitled "My Dollar Book".

## LESSON ACTIVITY

### Before Using the Page

• Display a one-dollar bill and see if the children can identify it by name. Give each child an opportunity to examine the bill. Write "one dollar" on the chalkboard. Ask how many cents have the same value as one dollar. Write "100 cents" on the chalkboard. Ask how many pennies are needed for 100 cents. Have each of ten children count ten pennies and place them beside the dollar bill. Write the number of pennies and their value as shown.

Ask how many nickels can be used in place of ten pennies. Have children place two nickels in front of each stack of ten pennies. Then have them count by fives as you point to each nickel, to ensure that the total value is 100 cents. Have a child count the nickels. Complete the next line of the chart as shown. Ask what coin could be used in place of ten pennies or two nickels. Have children place one dime beside

|             |           |
|-------------|-----------|
| 1 dollar    | 100 cents |
| 100 pennies | 100 cents |
| 20 nickels  | 100 cents |
| 10 dimes    | 100 cents |
| 4 quarters  | 100 cents |

each stack of pennies and the two nickels. Have the children count by tens to 100 as you point to the dimes.

Ask what other coin there is. Have the children count by twenty-fives to 100. Ask how many quarters have the same value as one dollar. Have the children count by twenty-fives again as you display four quarters. Write the last line shown in the chart above. Review the entries in the chart; that is, ten dimes have the same value as one dollar, and so on.

• Display two quarters and five dimes. Have the children determine whether this set of coins has the same value as one dollar. As the children watch, remove one quarter and replace it with two dimes and a nickel, and repeat the question. Replace five dimes with two quarters and repeat the question. Replace the nickel with five pennies and repeat the question. Remove one coin and ask if the set of coins has the same value as one dollar. Ask what the value is. Remind the children to start counting from the coins of greatest value.

### Using the Page

- Read and discuss the instructions with the children. Then let them work independently.



## LESSON OUTCOME

Add and subtract two-digit numbers, no regrouping, sums and minuends to 99

## Materials

place-value pocket chart, sticks, and numeral cards

## RELATED ACTIVITIES

- The page may be used to determine how well the children have understood the concept of addition and subtraction of two-digit numbers without regrouping. On the basis of the results, prepare remedial work such as reviewing addition and subtraction facts having sums and minuends to 9, and working with objects for grouping by tens.

- You may wish to use the same code to prepare other messages for the children to decode. Some children may be able to make up messages for other children to decode. Other messages that use the same code as the one on the page are as follows:

A car can go fast.

The ball is in the bag.

Learn to subtract right.

See the street sign at the left.

Be careful bouncing the ball on the street.

- The children may enjoy making up a code of their own and having other children decode messages.



Here is a code.

|    |    |    |    |    |
|----|----|----|----|----|
| 13 | 23 | 26 | 30 | 43 |
| B  | O  | U  | N  | C  |

|    |    |    |    |    |
|----|----|----|----|----|
| 45 | 47 | 48 | 50 | 56 |
| E  | F  | G  | A  | H  |

|    |    |    |    |    |
|----|----|----|----|----|
| 67 | 74 | 78 | 82 | 95 |
| L  | I  | R  | T  | S  |

Add or subtract.

What is the message?

|  |  |   |  |  |  |   |  |  |
|--|--|---|--|--|--|---|--|--|
| $\begin{array}{r} 37 \\ -24 \\ \hline \end{array}$ | $\begin{array}{r} 35 \\ +10 \\ \hline \end{array}$ | $\begin{array}{r} 48 \\ -5 \\ \hline \end{array}$ | $\begin{array}{r} 90 \\ -40 \\ \hline \end{array}$ | $\begin{array}{r} 32 \\ +46 \\ \hline \end{array}$ | $\begin{array}{r} 32 \\ +13 \\ \hline \end{array}$ | $\begin{array}{r} 5 \\ +42 \\ \hline \end{array}$ | $\begin{array}{r} 56 \\ -30 \\ \hline \end{array}$ | $\begin{array}{r} 37 \\ +30 \\ \hline \end{array}$ |
| 13   | 45   | 43  | 50   | 78   | 45   | 47  | 26   | 67   |
| B  | E  | C   | A  | R  | E  | F   | U  | L  |

|  |  |  |  |  |  |  |   |
|--|--|--|--|--|--|--|---|
| $\begin{array}{r} 89 \\ -46 \\ \hline \end{array}$ | $\begin{array}{r} 41 \\ +37 \\ \hline \end{array}$ | $\begin{array}{r} 64 \\ -41 \\ \hline \end{array}$ | $\begin{array}{r} 75 \\ +20 \\ \hline \end{array}$ | $\begin{array}{r} 11 \\ +84 \\ \hline \end{array}$ | $\begin{array}{r} 62 \\ +12 \\ \hline \end{array}$ | $\begin{array}{r} 20 \\ +10 \\ \hline \end{array}$ | $\begin{array}{r} 43 \\ +5 \\ \hline \end{array}$ |
| 43   | 78   | 23   | 95   | 95   | 74   | 30   | 48  |
| C  | R  | O  | S  | S  | I  | N  | G   |

|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|
| $\begin{array}{r} 60 \\ +22 \\ \hline \end{array}$ | $\begin{array}{r} 89 \\ -33 \\ \hline \end{array}$ | $\begin{array}{r} 13 \\ +32 \\ \hline \end{array}$ | $\begin{array}{r} 35 \\ +60 \\ \hline \end{array}$ | $\begin{array}{r} 71 \\ +11 \\ \hline \end{array}$ | $\begin{array}{r} 98 \\ -20 \\ \hline \end{array}$ | $\begin{array}{r} 77 \\ -32 \\ \hline \end{array}$ | $\begin{array}{r} 20 \\ +25 \\ \hline \end{array}$ | $\begin{array}{r} 92 \\ -10 \\ \hline \end{array}$ |
| 82   | 56   | 45   | 95   | 82   | 78   | 45   | 45   | 82   |
| T  | H  | E  | S  | T  | R  | E  | E  | T  |

146 (one hundred forty-six)

Addition and subtraction practice: sums and minuends to 99

## LESSON ACTIVITY

## Before Using the Page

- Use the place-value pocket chart described on page xxxi to review addition and subtraction of two-digit numbers without regrouping. Write  $32 + 41$  in vertical form on the chalkboard. Have a child place sticks in the pockets to represent the number of tens and the number of ones for 32. Ask how many more tens and how many more ones are needed and have a child place the appropriate number of sticks in each pocket. Have a child count the sticks in each pocket and insert the corresponding numeral card in the slit of that pocket. On the chalkboard have another child write the standard numeral for the sum.

Repeat the procedure for  $56 - 23$ . Watch to see whether the children remember to remove sticks from the pockets of the chart rather than place more sticks in the pockets for the second number.

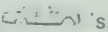
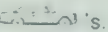
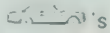
Have the children illustrate a few more addition and subtraction exercises using the pocket chart. Then have them complete several exercises without referring to the pocket chart.

## Using the Page

- Discuss the two completed exercises and ask children to explain why the letters B and E were chosen from the code. Name several other letters of the code and have children state the number associated with each letter.

Have the children complete all the addition and subtraction exercises first. Caution them to note whether they are to add or subtract. Then have them write the letter associated with each answer. Ask children to try to read the message.


Complete.

Jim counted 36 's.He counted 13 more 's.How many 's in all?49 's





$$\begin{array}{r} 36 \\ + 13 \\ \hline 49 \end{array}$$

Pat counted 24 's.She counted 10 's.How many more 's than 's?14 's


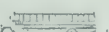

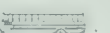

$$\begin{array}{r} 24 \\ - 10 \\ \hline 14 \end{array}$$

Bob counted 28 's.He counted 6 's.How many more 's than 's?22 's


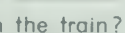
$$\begin{array}{r} 28 \\ - 6 \\ \hline 22 \end{array}$$

55 's were on the .24 more 's got on the .How many 's are on the .79 's

$$\begin{array}{r} 55 \\ + 24 \\ \hline 79 \end{array}$$

37 's are in the first .40 's are in the second .How many 's in all?77 's

$$\begin{array}{r} 37 \\ + 40 \\ \hline 77 \end{array}$$

68 's are on the .45 's get off the .

How many stay on the train?

23 's

$$\begin{array}{r} 68 \\ - 45 \\ \hline 23 \end{array}$$

Solving problems, sums and minuends to 99

(one hundred forty-seven) 147

**LESSON OUTCOME**

Solve a word problem requiring addition or subtraction, sums and minuends to 99

**Materials**

a sheet of paper for each child

**RELATED ACTIVITIES**

- Prepare a work sheet of addition and subtraction exercises in vertical form. Include answers that are correct and others that are not. For each exercise, have the children indicate whether the answer is correct and give the correct answer where necessary.

**LESSON ACTIVITY****Before Using the Page**

- Write several addition and subtraction exercises on the chalkboard. Give the children a few minutes to copy and complete them.

$$\begin{array}{r} 52 \\ + 34 \\ \hline \end{array} \quad \begin{array}{r} 46 \\ - 26 \\ \hline \end{array} \quad \begin{array}{r} 26 \\ + 23 \\ \hline \end{array} \quad \begin{array}{r} 35 \\ + 24 \\ \hline \end{array} \quad \begin{array}{r} 64 \\ - 11 \\ \hline \end{array}$$

After the children have finished, use the procedure of inventing a word problem to illustrate the situation for each pair of numbers. After the problem has been stated, have a child write the answer on the chalkboard and then make a concluding statement. For the first exercise, for example, point to the 52 and say, "I had 52 hockey cards"; point to the + and the 34 and say, "My friend gave me 34 more hockey cards"; point to where the sum will be written and say, "How many hockey cards do I have now?" Have a child write the sum (86) on the chalkboard and say, "You have 86 hockey cards now."

For the second exercise, you might say, "I had 46 peanuts. I fed 26 peanuts to the squirrels. How many peanuts do I have left?"

Have children create word problems to fit the other exercises, write the answers, and then make concluding statements.

- Have the children recall that addition is associated with a joining action and subtraction, with a separating action. Then write exercises in pairs similar to the following (no regrouping).

$$\begin{array}{r} 24 \\ + 13 \\ \hline \end{array} \quad \begin{array}{r} 24 \\ - 13 \\ \hline \end{array} \quad \begin{array}{r} 56 \\ + 22 \\ \hline \end{array} \quad \begin{array}{r} 56 \\ - 22 \\ \hline \end{array} \quad \begin{array}{r} 37 \\ + 10 \\ \hline \end{array} \quad \begin{array}{r} 37 \\ - 10 \\ \hline \end{array}$$

Tell a story that involves, for example, 24 and 13. Have the children determine whether the story implies a joining action or a separating action and indicate which of the two exercises would illustrate the problem.

**Using the Page**

- Help the children to interpret the words and the pictures on the page. You may wish to discuss the first problem with the children. Have them decide whether the problem requires addition or subtraction and then write the numbers in vertical form beside the problem. Remind them to include either the symbol + or the symbol - as required. Then have them find the sum and write the answer on the line.



## OBJECTIVE

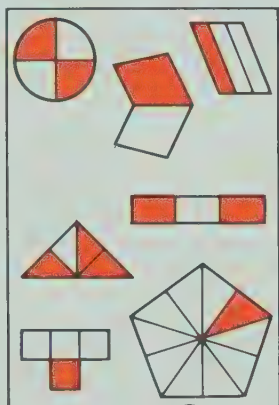
Demonstrate an understanding of concepts presented in this unit

## Materials

cards illustrating halves, thirds, fourths, tenths, numeral cards for fractions, one-dollar bill, real money, play money, or coin cutouts from copies of page T327, cards showing amounts to 99¢, an abacus for each child

## RELATED ACTIVITIES

- Prepare sheets illustrating different shapes for which fractional parts are colored as shown. Have the children cut out these shapes and paste them on the appropriate pages of their fraction booklets prepared for page 178. You may wish to check their work before they paste the shapes on the pages.



- You may wish to have the children work with odd and even numbers in the way described on page T189.

Subtract.

$$\begin{array}{r} 90 \\ -40 \\ \hline 50 \end{array}$$

$$\begin{array}{r} 37 \\ -2 \\ \hline 35 \end{array}$$

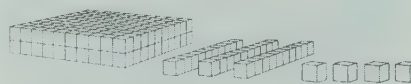
$$\begin{array}{r} 78 \\ -30 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 97 \\ -64 \\ \hline 33 \end{array}$$

$$\begin{array}{r} 48 \\ -18 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 86 \\ -34 \\ \hline 52 \end{array}$$

How many?



| hundreds | tens | ones |
|----------|------|------|
| 2        | 3    | 4    |

234

Complete.

125 126 127 128 129 130 131

105 110 115 120 125 130 135

130 140 150 160 170 180 190

I have 65¢.

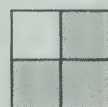
I spend 50¢.

I have 15 ¢ left.

Mark one third.



Match.



$\frac{1}{3}$

$\frac{2}{3}$

$\frac{2}{4}$

$\frac{3}{4}$

$\frac{5}{10}$

Check coins to make one dollar.



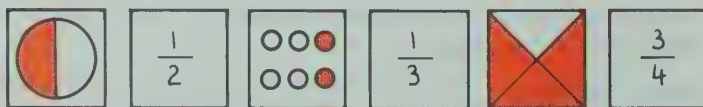
148 (one hundred forty-eight)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- Display a set of cards illustrating halves, thirds, fourths, tenths, and a set of numeral cards showing the fractions. Have children read each fraction and state its meaning. For example,  $\frac{1}{4}$  is read "one-fourth" and means one of four equal parts. Have children select a numeral card and place it beside the corresponding picture card.



- Display a one-dollar bill and have children identify it and state its value. Display a set of coins having a value of one dollar and have children state the amount. Have children display other sets of coins that have a value of one dollar. Display cards showing amounts to one dollar and have children match these with cards showing sets of coins.

- Introduce the abacus to review addition and subtraction of two-digit numbers without regrouping. (See page xxxi.) If possible, give each child an abacus and work with the children in small groups. Write an addition exercise on the chalkboard. Have the children represent the first number on the abacus. Have them include more beads to represent the second number. Have them count the beads on each wire and write the sum. For a subtraction exercise, they will remove the beads that represent the second number.

Have the children complete addition and subtraction exercises and then use the abacus to check their work.

- Refer to the number chart for 101 to 200, prepared earlier. Have the children count by ones, by fives, and by tens. Point to numerals and have children state the numbers. State numbers and have children write the numerals. Have children identify the number of hundreds, tens, and ones.

### Using the Page

- Review the purpose of this page. Discuss with the children how they are to complete the different types of exercises. Then let them work independently.

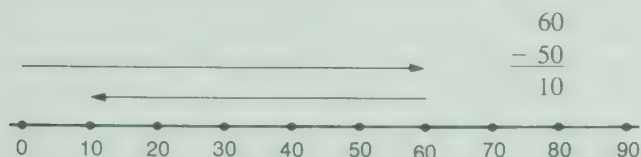
## Games and Activities

### Activity for page 130

Have the children observe patterns as they complete subtraction facts having minuends to 9 and the corresponding subtraction exercises involving multiples of ten (minuends to 90).

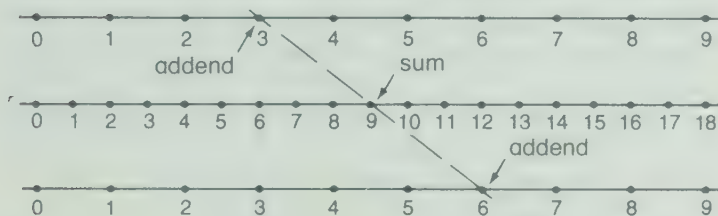
|     |      |     |      |
|-----|------|-----|------|
| 6   | 60   | 9   | 90   |
| - 5 | - 50 | - 3 | - 30 |

After the exercises have been completed, have the children illustrate on number lines the exercises having minuends to 90.



### Activity for page 134

Have the children place a straightedge in the position indicated by the broken line and draw the line. Point out how it illustrates the addition fact  $3 + 6 = 9$ . Have the children write the addition sentence and the three related sentences ( $6 + 3 = 9$ ,  $9 - 6 = 3$ ,  $9 - 3 = 6$ ).



Have the children use their straightedges to draw a line joining the dot for 4 in the first number line and the dot for 8 in the third number line. Point out how the line passes through the point for 12 in the second number line, illustrating the sum of 4 and 8. Have the children write the four related sentences. Have the children continue to draw lines and write the corresponding sentences.

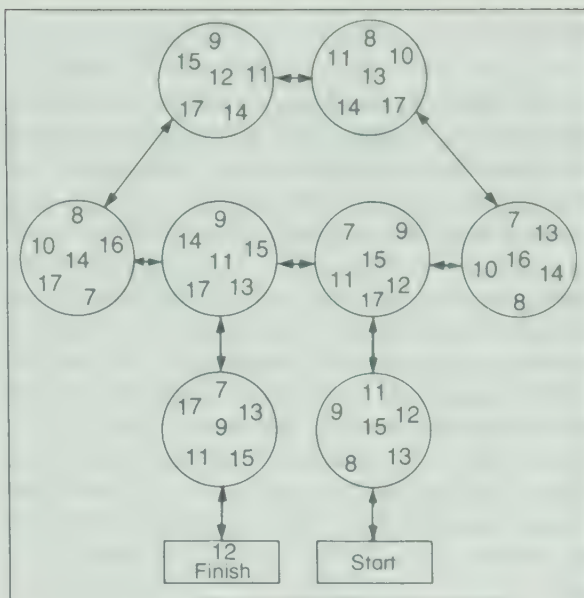
The work sheet may show several sets of three number lines. Each set may be designated for a certain number on the second number line. For example, all lines through 8 show the basic facts for a sum of 8, and these may be interpreted for both addition and subtraction.

Some children may find it easier to use a device made from a small piece of plywood and nails placed in the pattern of the three number lines. A rubber band placed around two appropriate nails will indicate the sum of the two numbers represented.

### Find Our Difference (Game for page 134)

#### Materials

- a game board similar to the one shown
- a marker for each player
- one die marked 1, 2, 3, 4, 5, 6
- one die marked 13, 14, 15, 16, 17, 18

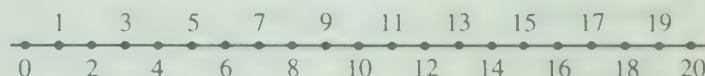


#### Rules

- The players take turns throwing the dice and finding the difference of the numbers shown on the two dice.
- Each player begins with her/his marker at "Start" and advances to the first circle only if the difference obtained is found there. Advances to successive circles can be made by following the same rule. Note that after the first move, several different choices are possible, as indicated by arrows. A player must move her/his marker if at all possible. Otherwise, the marker must stay where it is until the player's next turn.
- In order to enter "Finish", a player must obtain a difference of 12.
- The player who first enters "Finish" is the winner.

### Odd and Even Numbers (Activity for page 148)

Give each child two sets of number strips for the numbers from one to nine and a number line on which the numerals are arranged as shown.



Have the children choose two number strips and place each strip on the same side of the number line as the numeral appears. For example, a five-strip would be placed above the number line and a six-strip, below the line.

To show the sum of two numbers, the left end of one strip is placed at 0 and the other strip is placed at the right end of the first strip. The sum will be indicated either above the number line or below it.

Have the children place pairs of number strips as described above, and write the addition sentence illustrated by each pair.

You may wish to tell the children that the numbers indicated above the number line are called *odd* numbers and those below the line are called *even* numbers. Have the children choose pairs of addends in the following ways:

- odd number + odd number
- odd number + even number
- even number + even number
- even number + odd number



## Unit 8 Overview

In this unit the process of regrouping 10 ones as 1 ten in sums to 99 is introduced. The children also have experiences using extensions of basic facts in higher decades, but most of the emphasis is placed on regrouping. Place values of tens and ones are presented in a variety of ways in the early lessons of the unit to ensure a meaningful development of the process. The skills are applied in finding sums of money and in solving simple word problems. The *litre* is presented and children use it in estimating and in measuring the capacities of common containers. The *centimetre* is introduced and children learn to use it for measuring lengths to the nearest whole centimetre. One lesson is included to provide an application of addition in obtaining numerical data from a vertical bar graph and in using the information to answer questions. From the *Checkup* an evaluation of the children's progress using the skills and concepts of the unit can be made.

### Unit Outcomes

#### Number

- interpret a vertical bar graph
- add one-digit and two-digit numbers, no regrouping, sums to 99
- use the number line to complete patterns in addition, sums to 99
- complete patterns in extensions of basic addition facts, sums to 99
- regroup 10 ones as 1 ten
- add two-digit and one-digit numbers, regrouping to give multiples of ten for the sums
- add two-digit and one-digit numbers, regrouping, sums to 99
- add two-digit numbers, regrouping, sums to 99
- use the standard form for adding two-digit numbers, regrouping, sums to 99
- add three one-digit numbers, sums to 18
- add amounts of money, regrouping, sums to 99 cents
- solve problems involving addition, regrouping, sums to 99

#### Measurement

- compare the capacity of a container with that of a one-litre container
- estimate how many of a given container are equivalent to one litre; measure to check an estimate of capacity
- measure length in centimetres and to the nearest centimetre

#### Background

**Number:** The addition of three numbers was first introduced in Unit 2 and the children learned that the order of grouping the addends does not affect their sum. Because of this property a sum can be checked by adding the numbers in the opposite direction. The sums at that stage were 10 or less. In this unit the same property is applied in adding numbers having sums from 11 to 18. In most cases adding in one direction involves the use of basic facts, but in the other direction it requires extensions of basic facts. (See the overview for Unit 6 for comments on extensions.) For example, for  $5 + 4 + 7 = 16$ , adding to the right uses the basic facts  $5 + 4 = 9$  and  $9 + 7 = 16$ . Adding to the left uses the basic fact  $7 + 4 = 11$  and then  $11 + 5 = 16$ , which is an extension of the basic fact  $1 + 5 = 6$ .

Extensions of basic addition facts in higher decades may be of two types, those with the sum in the same decade (1), and those with the sum in the next decade (2).

- (1) Adding downward and upward involves no changing of tens in the second stage because the facts for that stage have sums less than 10.

$$\begin{array}{r} 6 \\ 7 \\ + 4 \\ \hline 17 \end{array} \quad \begin{array}{l} 6 + 7 = 13, \underline{13} + \underline{4} = \underline{17} \\ 4 + 7 = 11, \underline{11} + \underline{6} = \underline{17} \end{array}$$

- (2) Adding downward and upward involves a change of tens in the second stage because the basic facts for that stage have sums greater than 10.

$$\begin{array}{r} 9 \\ 8 \\ + 5 \\ \hline 22 \end{array} \quad \begin{array}{l} 9 + 8 = 17, \underline{17} + \underline{5} = \underline{22} \\ 5 + 8 = 13, \underline{13} + \underline{9} = \underline{22} \end{array}$$

Both types are very important, especially in column addition and some skills in using extensions with bridging (changing tens) should be developed before the process of regrouping or "carrying" is introduced.

In Unit 4, attention was given to the tens and ones represented by the digits in two-digit numbers. The children learned that ten ones can be regrouped as one ten. In this unit the concept of regrouping is extended and applied to the addition of two-digit numbers. Place values should be emphasized throughout this work so that the children develop an awareness of the fact that the number "carried" represents tens. In the example shown, the sum of the ones is 14, which can be regrouped as 1 ten and 4 ones, and it is the 1 ten that is "carried on" to be added to the other tens.

$$\begin{array}{r} \phantom{0}1 \\ 3 \text{ tens} \quad 9 \text{ ones} \\ + 1 \text{ ten} \quad 5 \text{ ones} \\ \hline 4 \text{ tens} \quad 14 \text{ ones} \\ 1 \text{ ten} \quad \swarrow \\ \hline 5 \text{ tens} \quad 4 \text{ ones} \end{array} \quad \begin{array}{r} 39 \\ + 15 \\ \hline 54 \end{array}$$

It should be pointed out here that extensions with bridging *must* be used in longer column addition (A) and *may* be used in the addition of a two-digit number and a one-digit number (B). Regrouping *may* also be used in such a case (C), and *is* most certainly used in adding two or more two-digit numbers (D).

|   |                                   |  |   |
|---|-----------------------------------|--|---|
| <p>A</p> $\begin{array}{r} 8 \\ 8 \\ + 7 \\ \hline 23 \end{array}$  | <p>8 + 8 = 16<br/>16 + 7 = 23</p> | <p>B</p> $\begin{array}{r} 68 \\ + 5 \\ \hline 73 \end{array}$       | <p>extension of<br/><math>8 + 5 = 13</math></p> |
| <p>C</p> $\begin{array}{r} 1 \\ 68 \\ + 5 \\ \hline 73 \end{array}$ |                                   | <p>D</p> $\begin{array}{r} 1 \\ 35 \\ + 49 \\ \hline 84 \end{array}$ |   |

Making a vertical bar graph was presented in Unit 7. This required a translation from numerical data to length of bars. In this unit, attention is directed to interpreting a vertical bar graph and to making comparisons of the data. This requires an inverse type of operation, that is, working from the bars shown, through the scale on the graph, to the numbers represented. Since a one-to-one scale has been used, it is unlikely the children will have difficulty identifying the numbers.

**Measurement:** The litre is introduced as a standard unit of capacity. Ice-cream tubs, milk cartons, and bottles of familiar products containing one litre can provide referents by which the children can acquire the concept of a litre. Skills of actual measuring are important, but equally valuable in real life are those of estimating. Exercises are provided for the children to estimate how many small containers they think may be required to make one litre.

The centimetre is the smallest unit of linear measure presented in this book. The metre was introduced in Unit 5 and the decimetre, in Unit 7. Of these three units, the metre and the centimetre are more important than the decimetre, but the tens relationship in the metric system is basic, and the decimetre serves as a link between the other two. The children can, and should, discover that a metre has the same length as one hundred centimetres. They should also acquire an awareness of the size of a centimetre, such as the width of a particular fingernail, the thickness of a crayon, or the width of a thumbtack. Although the centimetre is a relatively small unit, the children will discover that measurements of objects expressed in centimetres are only approximate. The exercises in this unit require the children to adjust their actual measurements either upward or downward to the nearest whole number of centimetres.

### Teaching Strategies

Addition of three or more addends involves basic facts and frequently extensions of them. The importance of extensions cannot be overemphasized because they are crucial in all column addition. Some children may know the basic facts having sums to 18, but may fail to transfer these to higher decades. For instance, regrouping is used when the sum of the ones in E is 14, but there is no time for regrouping in the middle of a column.

$$\begin{array}{r} \text{E} \quad 25 \\ + 39 \\ \hline 64 \end{array} \qquad \begin{array}{r} \text{F} \quad 7 \\ 5 \\ \hline 9 \\ 21 \end{array}$$

Extensions must be used, for example, in F: adding downward,  $7 + 5 = 12$  and  $12 + 9 = 21$  (an extension of  $2 + 9 = 11$ ) and adding upward,  $9 + 5 = 14$  and  $14 + 7 = 21$  (an extension of  $4 + 7 = 11$ ). Children usually need considerable practice in using extensions. They should respond quickly to examples, such as  $34 + 7$ ,  $54 + 7$ ,  $84 + 7$ , and  $42 + 9$ ,  $62 + 9$ ,  $82 + 9$ , which are related to the cases above. For this purpose, oral practice is preferable to written exercises, because if children are given too long to respond, they often revert to counting on from the first partial sum. To be most effective, oral drills should be conducted in small groups so that each child may be called upon to respond several times in a relatively short period of time. In large groups too many children wait too long. Rapid oral drills in small groups are suggested.

Much of the work in this unit is concerned with place value in two-digit numbers and with regrouping ten ones as one ten. Objects for grouping, abacus charts, and place-value pocket charts can be used extensively. Children should have considerable experience using such devices before they deal with renaming numbers on a purely abstract basis. The progression from objects to place-value devices to standard numerals should be gradual and thorough at each stage. The importance of place value cannot be overemphasized for it provides meaning to most of the operations with larger numbers.

The centimetre cubes in sets of Base Ten Blocks can be used in a variety of measuring activities. Since they are solids they can be used to measure volume, and since their faces are square they can also be used to cover surfaces to measure area. These two topics are of no concern at this time; but placed end to end, the cubes can be used to measure length in centimetres. Actually, interlocking Centicubes are preferable for measuring length in centimetres.

For the cross-number puzzle on page 169, two-digit numbers are written horizontally and vertically. The latter may require special attention since some children may not know whether to read them upward or downward. When written vertically, the tens' digit of a two-digit number is written uppermost. It might be advisable to provide some preliminary work in writing numbers with place-value names and relating these forms to number sentences and algorithms, as shown below.

$$\begin{array}{r} 9 \text{ tens } 8 \text{ ones} \\ 90 + 8 = 98 \end{array} \qquad \begin{array}{r} \boxed{9} \text{ tens} \\ \boxed{8} \text{ ones} \end{array} \qquad \begin{array}{r} 90 \\ + 8 \\ \hline 98 \end{array}$$

### Materials

large sheets of squared paper  
gummed square shapes  
Unifix cubes of two different colors  
demonstration number line, matching number strips for 1 to 9  
number lines from copies of page T331 (optional)  
number charts from copies of page T333 (optional)  
objects for grouping by tens  
models for 9 tens and 18 ones for each child  
a long, narrow strip of paper for each child  
display board and cutouts, overhead projector  
addition charts prepared on Bristol board (See page T203.)  
a chart for showing tens and ones  
six sets of numeral cards for 0 to 9  
hundred chart, game boards and numeral cards as described on page T206  
various containers of different sizes  
one-litre containers labelled as such  
the containers shown on pages 161 and 162 or suitable substitutes  
materials for filling containers (peas, rice, sand, water)  
prepared charts for recording the results of measuring the capacity of containers  
flash cards showing addition facts having sums to 18  
real money, play money, or coin cutouts from copies of page T327  
flash cards showing amounts to 99¢  
objects in the classroom suitable for counting  
unmarked metre sticks, metre sticks  
decimetre strips from page T339 for each child  
centimetre cubes or copies of centimetre strips from page T344  
objects to be measured in centimetres  
centimetre rulers or copies of page T340  
attribute blocks or suitable substitute  
cross-number puzzle on squared paper or cardboard  
flash cards showing tens and ones for renaming  
a flip chart for each child

### Vocabulary

|                 |                          |
|-----------------|--------------------------|
| regroup         | line segment             |
| litre (L)       | cross-number puzzle      |
| centimetre (cm) | quadrilateral (optional) |



## Unit 8 Theme – Neighborhoods

The purpose of this theme is to give the children an opportunity to explore the complexities of their own special world—the neighborhood. This study may help to arouse their social awareness and lead to respect and thoughtfulness for their environment and the people in it.

Make the neighborhood a learning centre. Take as many walks as possible to gather information. This approach will enable you to bring the neighborhood into the classroom.

### LANGUAGE ACTIVITIES

#### 1. A Neighborhood Walk

The best introduction to this theme would be a walk in the neighborhood. Before the walk have the children define the area that they consider to be their neighborhood. Sketch a large map and mark the boundaries of this neighborhood. Explain to the children that the purpose of the walk is to make observations that will help them to explain what makes up a neighborhood, this one in particular. Before the walk, make a list of the things the children plan to look for. This list may include:

- Plan—how the streets are arranged
- Homes—sizes and kinds of houses
- Stores—what kinds of stores there are in the neighborhood
- Activities—what people are doing in the neighborhood  
—what parks or recreational facilities there are

#### 2. After the Walk

Discuss the observations made on the walk in relation to the list of things that the children planned to look for. Discuss whether there were any surprises on the walk; that is, did the children see things that they had never noticed before.

Have the children write a description of their neighborhood based on the information gained from the walk.

#### 3. Interviewing People

In order to help the children realize that people have feelings about their neighborhood, have them conduct pre-arranged interviews with residents of the neighborhood. Several children may be chosen to conduct the interviews, preferably using a tape recorder. Involve the whole class in planning these questions:

- “How long have you lived in this neighborhood?”
- “Why did you move to this neighborhood?”
- “What features of this neighborhood do you like?”
- “What suggestions do you have for improving this neighborhood?”

It is advisable to conduct at least twelve interviews so that the children can analyse the results.

You may wish to use the results for the following activities:

- Make a bar graph to show how long families have lived in the neighborhood.
- Make a list of the reasons why people moved to this neighborhood. Discuss whether there are reasons that are similar.
- List the features of the neighborhood suggested in the interviews. Have the children illustrate the most popular features.
- Have the children study the suggestions for improvements. Ask them to write their opinions of one of the ideas. Provide time for the children to share their opinions.

#### 4. Who Am I?

Ask the children to recall the persons who were interviewed for Activity 3 as well as other persons that the children see from day to day, for example, the police officer, the mail carrier, the bus driver, the newspaper carrier. Ask children, in turn, to pretend to be one of these persons. Have the other children ask questions to find out who the “pretender” is. The “pretender” may answer only “yes” or “no” to each question.

With a bit of practice the children will learn to word their questions so that each question will provide a useful clue.

#### 5. Good Neighbors

Begin a discussion about neighbors. Ask what a neighbor is. Have the children decide what makes a good neighbor. Lead them to suggest things that we do together with neighbors. Ask the children to suggest things that they could do to welcome new people who move into the neighborhood.

#### 6. Neighborhood Contributors

Discuss with the children things that we can do to make the neighborhood a better place. Ask children to tell how their parents contribute to the development and the functioning of the neighborhood. For example, parents may be involved in the Boy Scout movement, in raising money for building projects, or in volunteer work for social organizations.

#### 7. Adopt-a-Grandparent

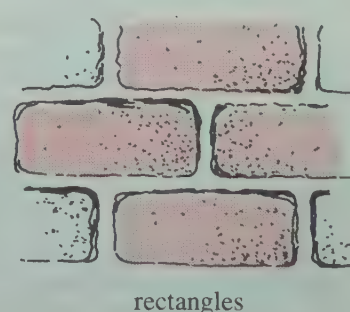
The parents of some of the children in your class may live far from their own parents. As a consequence, these children may have little or no contact with elderly persons.

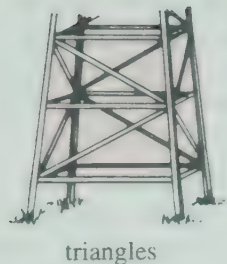
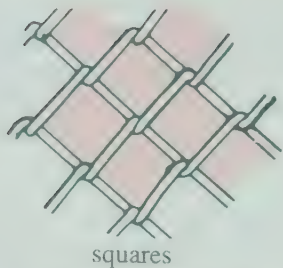
If there are elderly persons in your neighborhood, the children may be interested in and benefit from the experience of adopting one or two senior citizens as “class grandparents”. The children can run errands and do simple chores for these “grandparents”. In return the “grandparents” can talk to, answers questions for, tell stories to, and perhaps go for walks with these children. If possible, invite the “grandparents” to visit the school to help in celebrating special events with the children. Encourage the children to tell about their experiences with these “grandparents”.

### MATHEMATICS ACTIVITIES

#### 1. Identifying Geometric Patterns

Take the children on another walk in the neighborhood. This time have them identify patterns consisting of geometric shapes. Have each child draw and label a geometric pattern found in the neighborhood. Four of the most common patterns are shown here. Make a book of the children’s illustrations of geometric patterns.





## 2. Observing Symmetry

Refer to the observations made during the neighborhood walks. Discuss the kinds of things the children saw that have line symmetry. Have the children draw pictures of these things and show the line(s) of symmetry of each with a crayon or a thick pencil mark. Again, make a book of these illustrations.

## 3. I Went to Visit My Neighbor

This game will provide an opportunity for the children to say the numbers in sequence and to use combinations of one or more words that begin with the same letter of the alphabet, where possible.

The first player says, "I went to visit my neighbor and I took . . . ." The player completes the statement by using the word "one" and then names an item that one might give a neighbor. The second player must repeat the complete statement and include the word "two" followed by the name of another suitable item. The game continues with the complete statement being repeated and extended each time. If a player cannot name all the previous contributions, he/she must withdraw from the game.

If the children choose items and modifiers that start with the same letter, it will be easier for them to recall the items in the correct sequence. For example, the eighth player might find it necessary to repeat the following statement: "I went to visit my neighbor and I took one pumpkin pie, two jars of jelly, three tasty tarts, four fancy figs, five fat fish, six salt shakers, seven silver spoons, . . . ."

## SCIENCE ACTIVITIES

### 1. Science Investigations

Discuss with the children whether they think there is any air pollution in the neighborhood. To test for evidence of air pollution, have the children conduct the following experiment:

Fill a can having a wide opening about half full of tap water. Place the can outdoors in an open area, but do not allow rain to fall into the can. Check the can each day for about a week. On what day do the children first observe dirt and dust floating on the surface of the water?

Discuss what the main sources of this air pollution are. Are the worst offenders cars, factories, or incinerators?

Other topics that the children may investigate in the neighborhood are the following:

- What is the source of the water supply?
- What becomes of the garbage?
- How are most of the homes heated?
- How do the residents travel to work if they do not go by car?

### 2. Communities in Nature

Discuss with the children how some animals, birds, and insects live together in communities; for example, beavers live in a beaver colony, certain birds live in a bird sanctuary, ants live in an ant colony.

If the children are interested in observing the activities in one of these colonies, you may wish to have them make an ant colony according to the instructions given in the 1978 summer edition of *Owl*, a magazine for children about Canadian wild life.

## SOCIAL STUDIES ACTIVITIES

### 1. Making a Neighborhood Map

Refer to the sketch map made before the walk around the neighborhood. Mark the streets on which the children in the class live. Include any other streets that fall within the boundaries established.

Transfer this sketch map to a large sheet of mural paper. Allow the children to help in marking the streets.

When the map has been completed, have each child use stiff cardboard to make a model of her/his home. If children live in apartment buildings, have them work in groups. Have the children position the models in the correct locations on the map.

Discuss with the children which buildings are used by many people in the neighborhood. They may suggest the school, synagogues or churches, the library, and particular stores. Have the children make models of these buildings and locate them on the map.

Discuss whether there are other significant features in the neighborhood that should be shown on the map, for example, rivers, bridges, parks, playing fields, or golf courses. Have the children make models, if possible, or use crayons to indicate the features on the map.

### 2. History of the Neighborhood

Invite several longtime residents of the neighborhood to visit the class. Ask them to share the observations they have made of the neighborhood over the years. From this experience the children may realize that the neighborhood is a changing and developing entity.

A visitor to the classroom also provides an opportunity for the children to practise social skills in a realistic setting. Discuss with the children how to

- meet the visitor and escort her/him to the classroom;
- introduce the visitor to the class;
- listen carefully and attentively;
- ask probing questions;
- thank the visitor.

Ask the visitor to share information on the following concepts based on her/his own experiences or observations.

- Geographical changes — Have new parks been created?  
— Have streams been rerouted or filled in?  
— Have new streets been made?
- Social changes — Has there been a significant turnover in the population?  
— Are there more or fewer people in the neighborhood now than there were about five years ago?

### 3. Then and Now

Have the children compile a list of specific changes that have taken place in the neighborhood, based on the information shared by a longtime resident of the neighborhood. Have children illustrate these changes on large sheets of paper. Display these illustrations in pairs under the headings "Then and "Now".



#### 4. Neighborhood Protection

Most neighborhoods offer a feeling of safety to the residents. It is important that children realize there are local agencies and services whose job it is to maintain safety and offer protection in the neighborhood. It is also important for the children to realize that the residents are expected to co-operate with these protection agencies. Help the children identify these services, define their roles, and suggest ways in which we can help to make their jobs easier. Start with the following ideas.

##### *Crossing Guard*

Role: Assist pedestrians at traffic crossings.

How we can help: Cross streets with the crossing guard.  
Obey the crossing guard.

##### *Health Department*

Role: Conduct health tests.

Inspect restaurants and food stores.  
Check the water supply.

How we can help: Obey our doctor's instructions.  
Put all trash in proper containers.

##### *Fire Department*

Role: Check homes and stores for fire hazards.  
Teach fire safety and fire prevention.  
Fight fires.

How we can help: Discard newspapers and oily rags.  
Keep the telephone number of the fire department beside the telephone.  
Learn how to use a fire-alarm box.  
Keep matches away from small children.

##### *Police Department*

Role: Enforce traffic laws.  
Direct traffic.  
Teach traffic safety.  
Patrol neighborhoods.  
Apprehend law breakers.

How we can help: Practise traffic safety.  
Tell our parents about anything unusual or mysterious so that they can report it to the police.

#### 5. Neighborhood Services

The greater part of a neighborhood consists of accommodation or housing. The residents require services to meet their physical needs, to provide recreation, and to enrich their lives.

Have the children examine the services offered within the neighborhood. First, discuss the availability of helpers such as doctors, dentists, fire fighters, and police officers.

Next, discuss the kinds of stores and services available.

|              |               |
|--------------|---------------|
| bank         | food          |
| clothing     | laundry       |
| department   | pet           |
| drug         | shoe          |
| dry cleaning | trust company |
| florist      | variety       |

Discuss the provision of facilities for recreation. Consider how many of the following are in the neighborhood.

|                   |                  |
|-------------------|------------------|
| park              | golf course      |
| ice arena or rink | football field   |
| swimming pool     | tennis court     |
| movie theatre     | bowling centre   |
| fitness centre    | baseball diamond |

Discuss whether there are churches, schools, and a library in the neighborhood. Determine when it is necessary to travel outside the neighborhood to obtain particular services. Discuss why some services must meet the needs of a larger community than a neighborhood.

#### 6. New Beginnings

Ask the children to pretend that they are going to build a community in an uninhabited land. Have them discuss what some of the basic things are that they will need to start their community. Lead them to suggest the following needs:

- a fresh water supply
- soil to grow food
- a store for supplies
- a church
- a school
- people to make the rules so that they will all work together as a group
- a person to protect the other individuals and to see that the rules are kept

Lead a discussion with the children of how they will meet these needs and what difficulties they will encounter.

#### ART ACTIVITIES

##### 1. The Personal Touch

Although many houses in a neighborhood may be built in a similar style, they often look very different because of the use of shrubs, flowers, and fences. Have the children recall from their walks some of the landscaping techniques they noticed.

Have each child mark a large sheet of paper into three parts. Ask the children to draw the same house in each of the three parts. Then have them "landscape" the houses with different arrangements of trees, shrubs, flowers, or fences. The idea is to make each house look different. Display these homes so that the children can compare the results.

#### MOVEMENT ACTIVITIES

##### 1. Dance a Story

Tell a story of children walking through the neighborhood on their way to school. Describe their activities and the things they observe. Ask the children to tell about the movements suggested by the activities. Tell the story again as the children act it out through movement.

##### 2. What Is My Occupation?

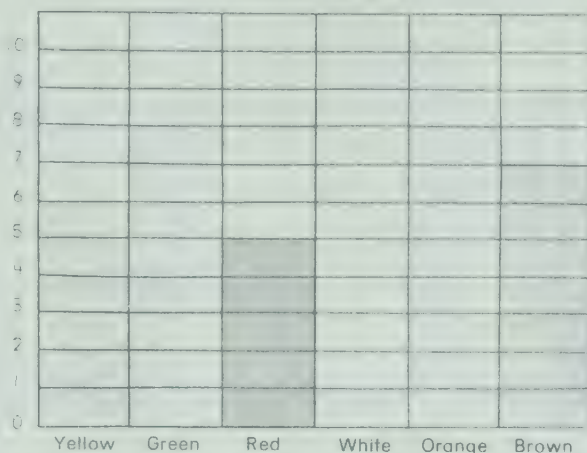
Discuss with the children the kinds of things that people do in the various occupations in your neighborhood. Discuss the movements that are involved in each kind of occupation. Ask each child to choose one of the occupations and plan and perform a sequence of movements that will give clues as to what occupation is being portrayed. Have the other children try to guess who the actor is portraying. The actor must not speak during the sequence of movements.

#### MUSIC ACTIVITIES

##### 1. A Neighborhood Song

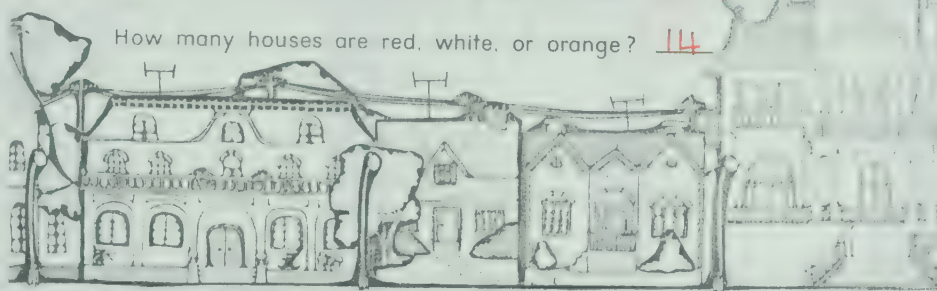
Have the children suggest the things that they like best about their neighborhood. Record these on a chart. Help the children use some of the suggestions to make up a song with the refrain "In Our Neighborhood".

Colors of Houses



Complete.

How many houses are

yellow? 6 green? 4 red? 5white? 9 orange? 0 brown? 7How many houses are yellow or white? 15How many houses are white or green? 13How many houses are yellow, green, or red? 15How many houses are red, white, or orange? 14

Interpreting a vertical bar graph

(one hundred forty-nine) 149

## LESSON OUTCOME

Interpret a vertical bar graph

## Materials

a large sheet of squared paper, a gummed square for each child

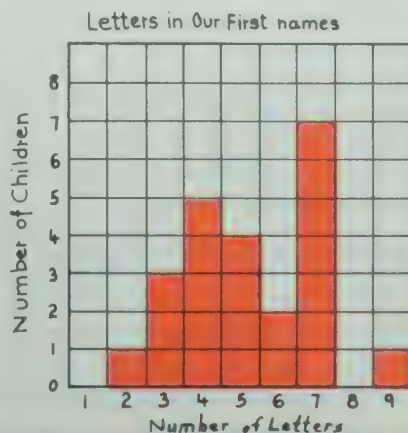
## RELATED ACTIVITIES

- Have children suggest other questions to be answered from the information shown in the graph. Also, you may wish to have the children write number sentences to show how the answers are arrived at for the last four questions on the page ( $6 + 9 = 15$ ,  $9 + 4 = 13$ ,  $6 + 4 + 5 = 15$ ,  $5 + 9 + 0 = 14$ ).

## LESSON ACTIVITY

## Before Using the Page

- Select a topic of interest to the children, such as their favorite TV program or the number of children in each family. The topic described here concerns the number of letters in the children's first names. It will be necessary for the children to decide whether nicknames or any short forms may be used. Have the children count the letters in their first name. Give each child a large gummed square. Have prepared in advance a large sheet of paper scaled to the dimensions of the gummed squares. Have the children help to prepare the title and headings as shown. Include the



vertical scale. Ask children, in turn, to place the gummed square in the column that indicates the number of letters in their first name. In this way, a vertical bar graph will be formed. Interpret the results by asking questions similar to these:

"How many children have 4 letters in their first name?"

"How many letters do the most children have in their first name?"

"What is the number of letters in the shortest name?"

"Do more children's names have 4 letters or 3 letters?"

"How many more children's names have 4 letters than 6 letters?"

"How many children's names have 5 letters or 6 letters?"

Ask the children how the vertical scale makes it easier for them to interpret the information in the graph.

The questions and the answers can be recorded on chart paper and displayed with the graph.

## Using the Page

- Ask the children to tell what the graph shows. Discuss how they are to proceed with the questions. It may be necessary to explain the meaning of the word "or" in the questions.



## OBJECTIVE

Add one-digit and two-digit numbers, no regrouping, sums to 99

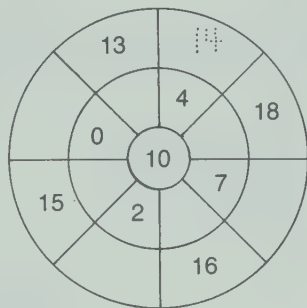
## Materials

ten Unifix cubes of one color and eight Unifix cubes of another color for each child

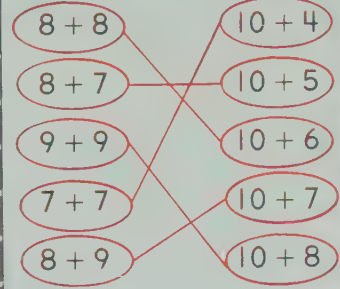
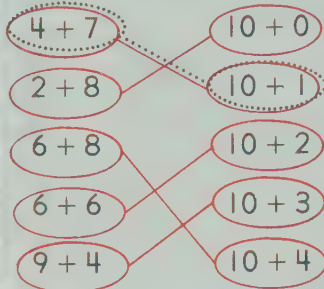
## RELATED ACTIVITIES

- To review comparing and ordering two-digit numbers, have the children write their sums in order from least to greatest for each row of addition exercises on page 150.
- Using copies of page T332, prepare addition tables and number wheels similar to the following for the children to complete.

|   |    |
|---|----|
| + | 10 |
| 3 | 13 |
| 6 | 16 |
|   | 14 |
| 5 |    |
| 8 |    |
|   | 10 |
| 1 |    |
|   | 17 |
|   | 12 |



Match.



Complete.

$$\begin{array}{l} 9 + 3 = 10 + \underline{2} \\ 4 + 8 = 10 + \underline{2} \\ 6 + 4 = 10 + \underline{0} \\ 5 + 6 = 10 + \underline{1} \end{array}$$

$$\begin{array}{l} 7 + 9 = 10 + \underline{6} \\ 5 + 8 = 10 + \underline{3} \\ 6 + 9 = 10 + \underline{5} \\ 9 + 5 = 10 + \underline{4} \end{array}$$

Add.

$$\begin{array}{r} 42 \\ + 21 \\ \hline 63 \end{array}$$

$$\begin{array}{r} 21 \\ + 36 \\ \hline 57 \end{array}$$

$$\begin{array}{r} 70 \\ + 15 \\ \hline 85 \end{array}$$

$$\begin{array}{r} 17 \\ + 12 \\ \hline 29 \end{array}$$

$$\begin{array}{r} 12 \\ + 35 \\ \hline 47 \end{array}$$

$$\begin{array}{r} 52 \\ + 12 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 33 \\ + 62 \\ \hline 95 \end{array}$$

$$\begin{array}{r} 14 \\ + 81 \\ \hline 95 \end{array}$$

$$\begin{array}{r} 43 \\ + 44 \\ \hline 87 \end{array}$$

$$\begin{array}{r} 19 \\ + 20 \\ \hline 39 \end{array}$$

$$\begin{array}{r} 56 \\ + 21 \\ \hline 77 \end{array}$$

$$\begin{array}{r} 31 \\ + 54 \\ \hline 85 \end{array}$$

$$\begin{array}{r} 43 \\ + 30 \\ \hline 73 \end{array}$$

$$\begin{array}{r} 52 \\ + 44 \\ \hline 96 \end{array}$$

$$\begin{array}{r} 36 \\ + 32 \\ \hline 68 \end{array}$$

$$\begin{array}{r} 35 \\ + 13 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 24 \\ + 65 \\ \hline 89 \end{array}$$

$$\begin{array}{r} 10 \\ + 54 \\ \hline 64 \end{array}$$

150 (one hundred fifty)

Addition practice: sums to 99

## LESSON ACTIVITY

### Before Using the Page

- Have each child use ten Unifix cubes of one color, for example, red, and eight Unifix cubes of another color, for example, yellow. Have the children represent each of the numbers from 10 to 18 by joining the ten red cubes and as many yellow cubes as are required to complete the number. Have children give statements such as "Fourteen is ten and four more." Then have them write the addition sentences on the chalkboard.
- Have the children use the Unifix cubes from the previous activity to demonstrate basic addition facts for sums of 10 to 18. Ensure that they use all the red cubes before yellow cubes are used. After each sum is found, ask the children to express the sum in the form  $10 + \underline{\quad}$ . For  $7 + 5$ , for example, the children would say "Twelve" first, and then "Ten plus two".
- Write several exercises similar to the following on the chalkboard.

$$9 + 7 = 10 + \underline{\quad}$$

Have the children use Unifix cubes to help complete the sentences.

- Use groups of ten Unifix cubes and single cubes to review the procedure of adding two-digit numbers with no regrouping. Write  $24 + 13$  in vertical form on the chalkboard. Have children display the tens and ones needed for 24 and then for 13, join the ones and then the tens, and state the sum.

### Using the Page

- Discuss the first example with the children. Have them trace over the first ring. Ask what is the sum of 4 and 7. You may wish to have them print 11 to the right of or above the  $4 + 7$ . Ask why the dotted line leads from  $4 + 7$  to  $10 + 1$ . Have the children trace over the dotted line and then ring  $10 + 1$ . Ask questions to ensure that the children understand how to continue with this part of the page.
- Discuss the example shown for the second part of the page. Ask for the sum of 9 and 3 and, if you wish, have the children print 12 above or to the left of  $9 + 3$ . Ask why 2 is the number that completes the sentence  $9 + 3 = 10 + \underline{\quad}$ . Have the children trace over the dotted 2. Some children may need to use Unifix cubes to help complete these exercises. Note that these exercises prepare the children for regrouping in addition.

Complete. Use the number line to help.



$16 + 2 = 18$

$16 + 3 = 19$

$16 + 4 = 20$

$16 + 5 = 21$

$16 + 6 = 22$

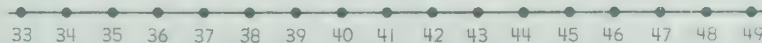
$25 + 3 = 28$

$25 + 4 = 29$

$25 + 5 = 30$

$25 + 6 = 31$

$25 + 7 = 32$



$36 + 1 = 37$

$36 + 2 = 38$

$36 + 3 = 39$

$36 + 4 = 40$

$36 + 5 = 41$

$34 + 4 = 38$

$34 + 5 = 39$

$34 + 6 = 40$

$34 + 7 = 41$

$34 + 8 = 42$

$33 + 5 = 38$

$33 + 6 = 39$

$33 + 7 = 40$

$33 + 8 = 41$

$33 + 9 = 42$

$42 + 5 = 47$

$42 + 6 = 48$

$42 + 7 = 49$

$42 + 8 = 50$

$42 + 9 = 51$

$57 + 2 = 59$

$57 + 3 = 60$

$57 + 4 = 61$

$57 + 5 = 62$

$57 + 6 = 63$

$68 + 1 = 69$

$68 + 2 = 70$

$68 + 3 = 71$

$68 + 4 = 72$

$68 + 5 = 73$

Patterns in addition on the number line

(one hundred fifty-one) 151

## LESSON OUTCOME

Use the number line to complete patterns in addition, sums to 99

## Materials

demonstration number line, number lines from copies of page T331 (optional)

## RELATED ACTIVITIES

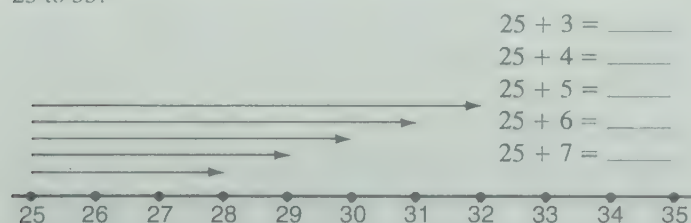
- Provide each child with a copy of page T333 and have her/him illustrate sums by coloring squares. For example, to illustrate  $48 + 6$ , the children would begin at 48 and count on six squares (49, 50, 51, 52, 53, 54), coloring each square except the sixth square for which they would ring the numeral.

## LESSON ACTIVITY

### Before Using the Page

- Use the number line to obtain sums in a pattern to prepare the children for the concept of addition with regrouping. Have the children observe the change in the digits as the sum approaches, reaches, and then passes the multiple of ten.

Select part of the number line, for example, the interval from 25 to 35.



Write the five addition sentences on the chalkboard. Begin at 25, draw an arrow to illustrate each addition sentence, and complete the corresponding sentence on the chalkboard. When all the answers are shown, discuss at which point a change occurs

in the tens' digit of the sums, and what happens to the ones' digit at that point.

Repeat the procedure for the same interval of the number line and illustrate the sequential sums:  $27 + 1$ ,  $27 + 2$ ,  $27 + 3$ ,  $27 + 4$ ,  $27 + 5$ ;  $28 + 1$ ,  $28 + 2$ ,  $28 + 3$ ,  $28 + 4$ ;  $26 + 2$ ,  $26 + 3$ ,  $26 + 4$ ,  $26 + 5$ ,  $26 + 6$ . Working on the same part of the number line for several sequences of sums may enable children to predict when the tens' digit will change, and to see that the ones' digit becomes 0 when this change occurs.

- Repeat the preceding activity for a different interval of the number line, for example, from 65 to 75.

### Using the Page

- The page continues the procedure suggested in *Before Using the Page*, except that the children do not need to draw the arrows on the number line.
- After the children have completed the page, discuss the eight patterns. The children may explain the change in their own words or you may ask questions: "Did the digit in the tens' place change? When? What digit is in the ones' place then? What digit is in the ones' place before this change?"



## LESSON OUTCOME

Complete patterns in extensions of basic addition facts, sums to 99

### Materials

demonstration number line, matching number strips for 1 to 9, number charts from copies of page T333 (optional), number lines from copies of page T331 (optional)

## RELATED ACTIVITIES

- You may wish to discuss the patterns for sums on the page in a manner similar to that suggested for the activities in *Before Using the Page*.
- Children may extend the patterns on the page to complete the sequences to sums less than 99. Have the children rearrange the exercises for the last two patterns so that the sums will be in sequence.

Complete the patterns.

|  |  |  |
|--|--|--|
| $6 + 3 = \underline{9}$<br>$16 + 3 = \underline{19}$<br>$26 + 3 = \underline{29}$<br>$36 + 3 = \underline{39}$<br>$46 + 3 = \underline{49}$  | $9 + 2 = \underline{11}$<br>$19 + 2 = \underline{21}$<br>$29 + 2 = \underline{31}$<br>$39 + 2 = \underline{42}$<br>$49 + 2 = \underline{52}$ | $7 + 5 = \underline{12}$<br>$17 + 5 = \underline{22}$<br>$27 + 5 = \underline{32}$<br>$37 + 5 = \underline{42}$<br>$47 + 5 = \underline{52}$ |
| $4 + 9 = \underline{13}$<br>$14 + 9 = \underline{23}$<br>$24 + 9 = \underline{33}$<br>$34 + 9 = \underline{43}$<br>$44 + 9 = \underline{53}$ | $8 + 6 = \underline{14}$<br>$18 + 6 = \underline{24}$<br>$28 + 6 = \underline{34}$<br>$38 + 6 = \underline{44}$<br>$48 + 6 = \underline{54}$ | $7 + 8 = \underline{15}$<br>$17 + 8 = \underline{25}$<br>$27 + 8 = \underline{35}$<br>$37 + 8 = \underline{45}$<br>$47 + 8 = \underline{55}$ |

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| $\begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$ | $\begin{array}{r} 14 \\ + 6 \\ \hline 20 \end{array}$ | $\begin{array}{r} 24 \\ + 6 \\ \hline 30 \end{array}$ | $\begin{array}{r} 34 \\ + 6 \\ \hline 40 \end{array}$ | $\begin{array}{r} 44 \\ + 6 \\ \hline 50 \end{array}$ | $\begin{array}{r} 54 \\ + 6 \\ \hline 60 \end{array}$ |
| $\begin{array}{r} 5 \\ + 9 \\ \hline 14 \end{array}$ | $\begin{array}{r} 35 \\ + 9 \\ \hline 44 \end{array}$ | $\begin{array}{r} 45 \\ + 9 \\ \hline 54 \end{array}$ | $\begin{array}{r} 55 \\ + 9 \\ \hline 64 \end{array}$ | $\begin{array}{r} 75 \\ + 9 \\ \hline 84 \end{array}$ | $\begin{array}{r} 25 \\ + 9 \\ \hline 34 \end{array}$ |
| $\begin{array}{r} 4 \\ + 7 \\ \hline 11 \end{array}$ | $\begin{array}{r} 54 \\ + 7 \\ \hline 61 \end{array}$ | $\begin{array}{r} 64 \\ + 7 \\ \hline 71 \end{array}$ | $\begin{array}{r} 34 \\ + 7 \\ \hline 41 \end{array}$ | $\begin{array}{r} 24 \\ + 7 \\ \hline 31 \end{array}$ | $\begin{array}{r} 74 \\ + 7 \\ \hline 81 \end{array}$ |

152 (one hundred fifty-two)

Patterns in addition, sums to 99

## LESSON ACTIVITY

### Before Using the Page

- Write addition sentences having the pattern  $2 + 4 = \underline{\quad}$ ,  $12 + 4 = \underline{\quad}$ ,  $22 + 4 = \underline{\quad}$ ,  $32 + 4 = \underline{\quad}$  on the chalkboard. Children should be able to state the sums promptly by applying the basic fact  $2 + 4 = 6$ . If you wish, you may show the pattern on the number line, using the procedure described on page T157. Have the children extend the pattern to include  $92 + 4 = \underline{\quad}$  and write the sums without using the number line.
- Use the procedure of the previous activity and have children demonstrate how to find this sequence of sums:  $7 + 5 = \underline{\quad}$ ,  $17 + 5 = \underline{\quad}$ ,  $27 + 5 = \underline{\quad}$ ,  $37 + 5 = \underline{\quad}$ , and  $47 + 5 = \underline{\quad}$ . Have the children write the sums and extend the pattern to include  $87 + 5 = \underline{\quad}$ . Encourage the children to write the sums without referring to the number line.
- Repeat the above procedure for a sequence that starts, for example, with  $33 + 8 = \underline{\quad}$  and stops at  $63 + 8 = \underline{\quad}$ . Then have the children extend the sequence at both ends to complete the pattern from  $3 + 8 = \underline{\quad}$  to  $83 + 8 = \underline{\quad}$ .

- Direct the children's attention to the tens' digit of the first addend and the tens' digit of the sum in each addition sentence for the preceding sequences. The number line may be used to show the move into the next decade in each case.

$$\begin{array}{r} 5 + 8 = \underline{13} \\ 15 + 8 = \underline{23} \\ 25 + 8 = \underline{33} \\ 35 + 8 = \underline{43} \end{array}$$

- Provide oral drill involving sequences of addition sentences based on the same basic fact, to give children practice in using the patterns.

### Using the Page

- The page continues the procedure established in *Before Using the Page*. Have the children complete the patterns. For assistance, children may refer to the demonstration number line, use a number chart as suggested in *Related Activities* on page T197, or mark number lines as suggested for using page 151.

Regroup to show more tens.

2 tens 16 ones  
3 tens 6 ones 36

3 tens 4 ones 34

4 tens 5 ones 45

2 tens 16 ones  
3 tens 6 ones 36

3 tens 11 ones  
4 tens 1 one 41

5 tens 10 ones  
6 tens 0 ones 60

1 ten 12 ones  
2 tens 2 ones 22

7 tens 17 ones  
8 tens 7 ones 87

6 tens 18 ones  
7 tens 8 ones 78

8 tens 13 ones  
9 tens 3 ones 93

0 tens 19 ones  
1 ten 9 ones 19

Regrouping 10 ones as 1 ten

(one hundred fifty-three) 153

## LESSON OUTCOME

Regroup 10 ones as 1 ten

## Materials

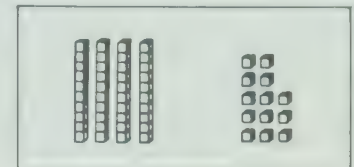
objects for grouping by tens, models for 9 tens and 18 ones for each child

## Vocabulary

regroup

## RELATED ACTIVITIES

- Prepare work sheets or work cards showing tens and ones. Have the children write the number of tens and ones, regroup the ones and write the new number of tens and ones, and then write the standard numeral for each.



4 tens 13 ones  
5 tens 3 ones  
53

## LESSON ACTIVITY

## Before Using the Page

- Review the concept of tens and ones for the numbers from 10 to 18 with and without using objects.
- Have a child choose a number between 20 and 100 and write the standard numeral on the chalkboard. Have another child state the number of tens and the number of ones. Repeat for several different numbers.

State a number of tens and a number of ones and have children write the standard numeral on the chalkboard and read it. Repeat several times for numbers between 20 and 100.

- Display models of 2 tens and 16 ones. Have a child determine what number is represented. Discuss why this procedure takes more time than usual (because there are so many ones). When the child has finished counting, write the numeral on the chalkboard (36). Point to the numeral 36 and ask how many tens and how many ones there are. The reply will be "3 tens and 6 ones". Look at the 2 tens and 16 ones on display and repeat the answer as a question, "3 tens and 6 ones?" Have a child count the tens and the ones and write this on the chalkboard (2 tens 16

ones). By this time, some children may be suggesting that you can exchange ten ones for one ten. If not, lead the children to suggest this. Have a child regroup the 16 ones and write the new number of tens and ones on the chalkboard (3 tens 6 ones). Review the fact that you started with 2 tens 16 ones, regrouped 16 ones as 1 ten 6 ones, and then there were 3 tens 6 ones, or 36. Emphasize that 2 tens 16 ones and 3 tens 6 ones both name the same number, 36.

Repeat the above procedure for, say, models of 5 tens and 14 ones.

- Children often view the above procedure as a game for which they are required to "tidy up" the number of ones by exchanging one ten for ten ones. Develop several examples on the chalkboard in the form shown.

3 tens 16 ones  
4 tens 6 ones 46

## Using the Page

- Discuss the first exercise with the children. Then let them work independently.



## LESSON OUTCOME

Add two-digit and one-digit numbers, regrouping to give multiples of ten for the sums

## Materials

objects for grouping by tens, models for 9 tens and 10 ones for each child

## RELATED ACTIVITIES

- You may wish to have the children work in pairs using an abacus chart. Each child will need 9 tens and 9 ones. One child places some tens and ones on the chart and states the number. The partner tells how many more ones are needed to make ten ones and places them on the chart. Then he/she regroups the ones to make one ten and places the ten on the appropriate side of the chart. The first child states the new number. Have the partners alternate their roles.

Complete.

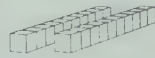


$$\begin{array}{r} 1 \text{ ten} \quad 7 \text{ ones} \\ + \quad \quad \quad 3 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 1 \text{ ten} \quad 10 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 2 \text{ tens} \quad 0 \text{ ones} \\ \hline \end{array}$$

20



$$\begin{array}{r} 2 \text{ tens} \quad 6 \text{ ones} \\ + \quad \quad \quad 4 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 2 \text{ tens} \quad 10 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 3 \text{ tens} \quad 0 \text{ ones} \\ \hline \end{array}$$

30



$$\begin{array}{r} 3 \text{ tens} \quad 8 \text{ ones} \\ + \quad \quad \quad 2 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 3 \text{ tens} \quad 10 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 4 \text{ tens} \quad 0 \text{ ones} \\ \hline \end{array}$$

40



$$\begin{array}{r} 5 \text{ tens} \quad 9 \text{ ones} \\ + \quad \quad \quad 1 \text{ one} \\ \hline \end{array}$$

$$\begin{array}{r} 5 \text{ tens} \quad 10 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 6 \text{ tens} \quad 0 \text{ ones} \\ \hline \end{array}$$

60

$$\begin{array}{r} 7 \text{ tens} \quad 5 \text{ ones} \\ + \quad \quad \quad 5 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 7 \text{ tens} \quad 10 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 8 \text{ tens} \quad 0 \text{ ones} \\ \hline \end{array}$$

80



## LESSON ACTIVITY

## Before Using the Page

- Begin with a quick oral review of addition facts having sums of 10. Children may suggest the correct combinations if you say, "Name two numbers that have a sum of 10." Also, you may state one number and have children state what the second number must be to obtain a sum of 10.
- Have children use objects for grouping to complete two or three exercises having the same form as those on page 153.
- Have the children display models of 4 tens and 3 ones. Say, "Show 7 more ones." Ask them how many ones they have. Lead them to suggest that since they have 10 ones, these may be regrouped to give one more ten. When the grouping has been completed, ask, "How many tens and ones are there now?"

Have the children display 5 tens and 6 ones. Then have them show 4 more ones, regroup, and state the number of tens and ones. Repeat the procedure for other numbers such that the combined number of ones will be 10. The children may begin to comment that each time they obtain one more ten but there are

zero ones. If necessary, ask questions to lead them to realize this.

- Record on the chalkboard the steps of the previous activity. The procedure might be as follows.

"Show 4 tens and 3 ones."

4 tens 3 ones

"Show 7 more ones."

+ 7 ones

"How many tens and ones are there in all?"

4 tens 10 ones

"Since there are 10 ones, what do we do?"

"How many tens and ones are there now?"

5 tens 0 ones

"What number is this?"

50

Repeat the procedure for other numbers.

## Using the Page

- Discuss the first exercise with the children. Ask how many tens there are. Then have them count the ones and state how many tens and ones there are altogether. Ask a child to explain the one ten made up of two colors. Point out that there are now 0 ones. Then let the children work independently.

Complete.



$$\begin{array}{r} 1 \text{ ten} \quad 8 \text{ ones} \\ + \quad \quad 5 \text{ ones} \\ \hline \end{array}$$



$$\begin{array}{r} 1 \text{ ten} \quad 13 \text{ ones} \\ 2 \text{ tens} \quad 3 \text{ ones} \\ \hline 23 \end{array}$$



$$\begin{array}{r} 2 \text{ tens} \quad 7 \text{ ones} \\ + \quad \quad 4 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 2 \text{ tens} \quad 11 \text{ ones} \\ 3 \text{ tens} \quad 1 \text{ one} \\ \hline 31 \end{array}$$

$$\begin{array}{r} 2 \text{ tens} \quad 8 \text{ ones} \\ + \quad \quad 3 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 2 \text{ tens} \quad 11 \text{ ones} \\ 3 \text{ tens} \quad 1 \text{ one} \\ \hline 31 \end{array}$$

$$\begin{array}{r} 3 \text{ tens} \quad 9 \text{ ones} \\ + \quad \quad 4 \text{ ones} \\ \hline \end{array}$$

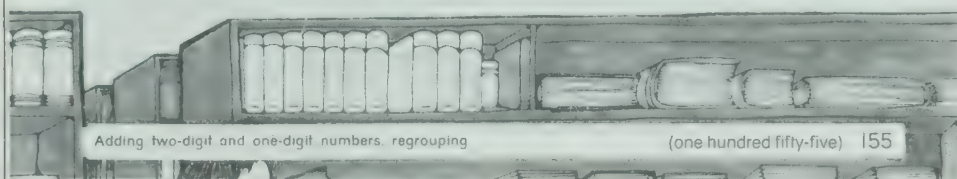
$$\begin{array}{r} 3 \text{ tens} \quad 13 \text{ ones} \\ 4 \text{ tens} \quad 3 \text{ ones} \\ \hline 43 \end{array}$$

$$\begin{array}{r} 4 \text{ tens} \quad 7 \text{ ones} \\ + \quad \quad 7 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 4 \text{ tens} \quad 14 \text{ ones} \\ 5 \text{ tens} \quad 4 \text{ ones} \\ \hline 54 \end{array}$$

$$\begin{array}{r} 6 \text{ tens} \quad 6 \text{ ones} \\ + \quad \quad 9 \text{ ones} \\ \hline \end{array}$$

$$\begin{array}{r} 6 \text{ tens} \quad 15 \text{ ones} \\ 7 \text{ tens} \quad 5 \text{ ones} \\ \hline 75 \end{array}$$



## LESSON OUTCOME

Add two-digit and one-digit numbers, regrouping, sums to 99

### Materials

objects for grouping by tens, models for 9 tens and 18 ones for each child

## RELATED ACTIVITIES

• Children may work alone or in pairs for the following activity, using one red die marked 2, 3, 4, 5, 6, 7 and one blue die marked 5, 6, 7, 8, 9, 9. The red die will indicate a number of tens and the blue die, a number of ones. The dice are tossed and then objects for grouping are arranged to represent the two-digit number. Then the blue die is tossed and some ones are shown with the first group. Ten ones are regrouped to form one ten. Then the new number of tens and ones is determined.

The children may record their work on a work sheet on which there are lines for tens and ones as shown on page 155. You may wish to specify the number of exercises the children should complete.

## LESSON ACTIVITY

### Before Using the Page

- Conduct a quick oral review of basic addition facts having sums from 11 to 18.
- Have children use objects for grouping to complete two or three exercises having the same form as those on page 154.
- Have the children display 3 tens and 7 ones. Ask what number this is. Then have them show 5 more ones. Ask, "How many tens and ones are there now?" Do you have enough ones to regroup?" They may suggest that they have too many. Have them regroup ten ones to make one ten and ask them to state the number of tens and ones (4 tens 2 ones).

Record on the chalkboard the steps in the procedure.

"How many tens and ones are there?" 3 tens 7 ones  
 "How many more ones are there?" + 5 ones  
 "How many tens and ones are there in all?" 3 tens 12 ones  
 "Since there are 12 ones, what do we do?"

"How many tens and ones are there now?"

4 tens 2 ones

"What number is this?"

42

- Give oral instructions and continue the procedure of the previous activity. Eventually, write exercises on the chalkboard and have children complete them, using their models of tens and ones. Have children help to show the results on the chalkboard and state what they did. If possible, the children should attempt the last few exercises without using their models. They may use the models for checking their work.

### Using the Page

- Discuss the first exercise with the children. Ask how many tens and ones there are. Have them explain the significance of the one ten made up of two different colors. You may wish to have the children ring the eight white ones and the two yellow ones and draw an arrow pointing to the one ten they make. Then let the children work independently.



## LESSON OUTCOME

Add two-digit and one-digit numbers, regrouping, sums to 99



### Materials

a long, narrow strip of paper for each child, objects for grouping by tens, models for 9 tens and 18 ones for each child

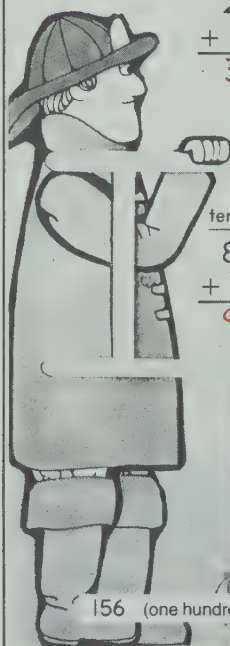
## RELATED ACTIVITIES

- Have the children practise renaming tens and ones as standard numerals. Write, for example, 6 tens 12 ones on the chalkboard and have the children respond by showing the standard numeral on their flip charts. (See page T107.)

Complete.

|  |  |   |   |
|--|--|---|---|
| $\begin{array}{r} 3 \text{ tens} \quad 9 \text{ ones} \\ + \quad \quad 3 \text{ ones} \\ \hline 3 \text{ tens} \quad 12 \text{ ones} \\ \hline 42 \end{array}$ |  | $\begin{array}{r} 3 \text{ tens} \quad 9 \text{ ones} \\ + \quad \quad 3 \text{ ones} \\ \hline 4 \text{ tens} \quad 2 \text{ ones} \\ \hline 42 \end{array}$ |  |
|--|--|---|---|

|   |   |
|---|---|
| $\begin{array}{r} 5 \text{ tens} \quad 7 \text{ ones} \\ + \quad \quad 7 \text{ ones} \\ \hline 6 \text{ tens} \quad 4 \text{ ones} \\ \hline 64 \end{array}$ | $\begin{array}{r} 6 \text{ tens} \quad 6 \text{ ones} \\ + \quad \quad 9 \text{ ones} \\ \hline 7 \text{ tens} \quad 5 \text{ ones} \\ \hline 75 \end{array}$ |
|---|---|



| tens | ones |
|------|------|
| 2    | 4    |
| +    | 8    |
| 3    | 2    |

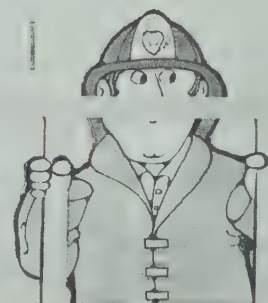
| tens | ones |
|------|------|
| 4    | 9    |
| +    | 8    |
| 5    | 7    |

| tens | ones |
|------|------|
| 7    | 8    |
| +    | 7    |
| 8    | 5    |

| tens | ones |
|------|------|
| 8    | 7    |
| +    | 4    |
| 9    | 1    |

| tens | ones |
|------|------|
| 1    | 9    |
| +    | 7    |
| 2    | 6    |

| tens | ones |
|------|------|
| 7    | 6    |
| +    | 7    |
| 8    | 3    |



| tens | ones |
|------|------|
| 5    | 8    |
| +    | 9    |
| 6    | 7    |

| tens | ones |
|------|------|
| 8    | 9    |
| +    | 5    |
| 9    | 4    |

| tens | ones |
|------|------|
| 3    | 9    |
| +    | 9    |
| 4    | 8    |

| tens | ones |
|------|------|
| 6    | 5    |
| +    | 8    |
| 7    | 3    |

| tens | ones |
|------|------|
| 4    | 8    |
| +    | 8    |
| 5    | 6    |

156 (one hundred fifty-six)

Adding two-digit and one-digit numbers, regrouping

## LESSON ACTIVITY

### Before Using the Page

- Write on the chalkboard the exercise shown. Have the children use their models to help complete the exercise. Follow the procedure of asking questions similar to those suggested on page T201.

|            |            |
|------------|------------|
| 5 tens     | 8 ones     |
| +          | 9 ones     |
| _____ tens | _____ ones |
| _____ tens | _____ ones |

| tens | ones |
|------|------|
| 5    | 8    |
| +    | 9    |
|      |      |

- Have each child fold a long, narrow strip of paper in half lengthwise and print *tens* at the top of the left half and *ones* at the top of the right half. Show the children how to write the exercise just discussed in the simpler arrangement. Since it was used in the earlier work with tens and ones, children will likely feel comfortable with its use here as being more efficient than writing the words *tens* and *ones* each time. Keep in mind that children are still using models to illustrate all the steps involved.

Write several exercises on the chalkboard. Have the children copy and complete each one with the help of their models. You may wish to have the children draw a line along the fold in the strip to emphasize the two columns.

Have children write the answers on the chalkboard and discuss the results. Children may notice that the number of tens is one more each time. You may wish to ask, for example, "There were 5 tens but now there are 6 tens. Why?" "If 8 ones and 9 ones are 17 ones, why does the answer show only 7 ones?" The method of showing the extra ten in the tens' column is introduced for the first time on page 157.

### Using the Page

- Have the children count the tens and the ones of each color in the first exercise. Have them match the green tens, draw a ring around the nine green ones and the one yellow one, and then draw an arrow pointing to the one ten they make. Discuss the two ways of showing the number of tens and ones in all. Encourage the children to use the second way for the exercises on this page. Let the children work independently, using models to obtain the sums in standard form.

## LESSON OUTCOME

Add two-digit numbers, regrouping,  
sums to 99

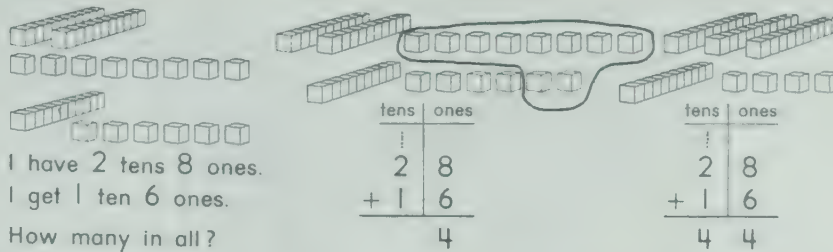
## Materials

overhead projector, models for tens and ones, addition charts for tens and ones prepared on Bristol board for use with the models

## RELATED ACTIVITIES

- For children who have difficulty renaming the ones mentally, you may wish to have them use the following method for recording their answers.

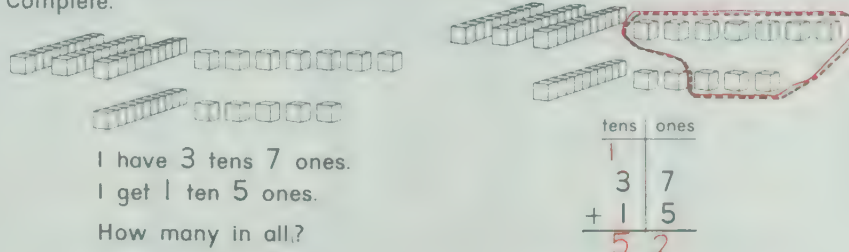
| tens         | ones         |
|--------------|--------------|
| 7            | 5            |
| <del>7</del> | <del>5</del> |
| 15           |              |



| tens | ones |
|------|------|
| 2    | 8    |
| + 1  | 6    |
| 4    | 4    |

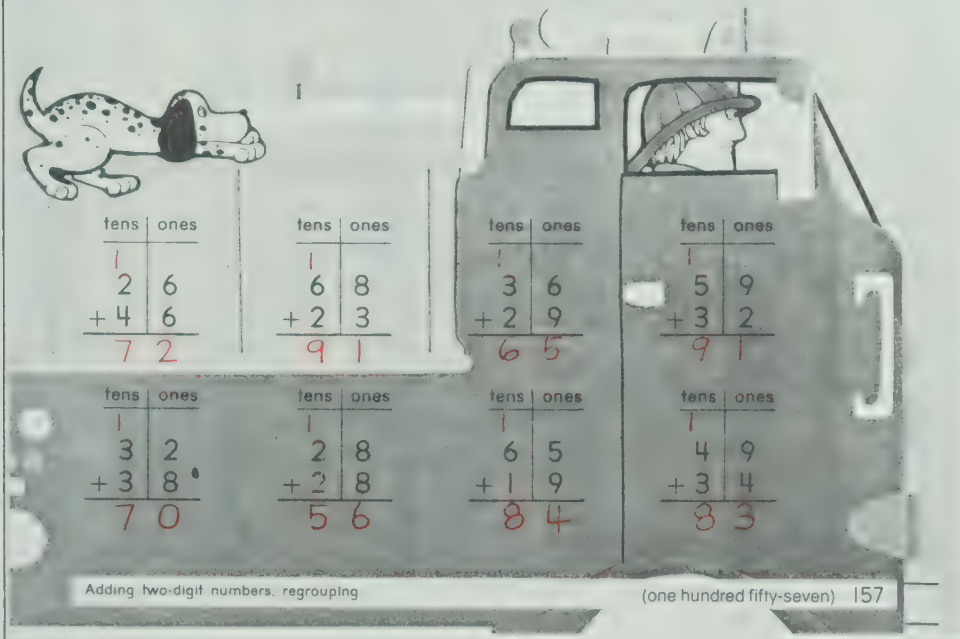
| tens | ones |
|------|------|
| 2    | 8    |
| + 1  | 6    |
| 4    | 4    |

Complete.



I have 3 tens 7 ones.  
I get 1 ten 5 ones.  
How many in all?

| tens | ones |
|------|------|
| 3    | 7    |
| + 1  | 5    |
| 5    | 2    |



| tens | ones |
|------|------|
| 2    | 6    |
| + 4  | 6    |
| 7    | 2    |

| tens | ones |
|------|------|
| 6    | 8    |
| + 2  | 3    |
| 9    | 1    |

| tens | ones |
|------|------|
| 3    | 6    |
| + 2  | 9    |
| 6    | 5    |

| tens | ones |
|------|------|
| 5    | 9    |
| + 3  | 2    |
| 9    | 1    |

| tens | ones |
|------|------|
| 3    | 2    |
| + 3  | 8    |
| 7    | 0    |

| tens | ones |
|------|------|
| 2    | 8    |
| + 2  | 8    |
| 5    | 6    |

| tens | ones |
|------|------|
| 6    | 5    |
| + 1  | 9    |
| 8    | 4    |

| tens | ones |
|------|------|
| 4    | 9    |
| + 3  | 4    |
| 8    | 3    |

Adding two-digit numbers, regrouping

(one hundred fifty-seven) 157

## LESSON ACTIVITY

## Before Using the Page

- Introduce the procedure of showing in the tens' column the extra ten resulting from regrouping the ones. Use models on the overhead projector to develop the sum of 24 and 18 as the children use models on their addition charts (A). Have them represent 24 as the first addend and 18 as the second addend. Ask them to join all the ones and move them to the bottom of the one's column. Ask, "What is the sum of 4 ones and 8 ones?"

| A | tens | ones | tens | ones | tens | ones | tens | ones |
|---|------|------|------|------|------|------|------|------|
|   |      |      |      |      |      |      |      |      |
|   |      |      |      |      |      |      |      |      |
|   |      |      |      |      |      |      |      |      |

What do we have when we regroup 12 ones?" When the children regroup the 12 ones as 1 ten 2 ones, emphasize that this "new" ten is placed at the top of the tens' column.

Then have them join this ten with the other tens and move them to the bottom of the tens' column. Ask how many tens and ones there are in all and what number this is.

Review the procedure by questioning the children as you develop  $24 + 18$  in place-value form on the chalkboard (B). Use other similar exercises. Then have the children try several exercises on their own and help to write the answers on the chalkboard. Have them use models to check the answers.

| B | tens | ones |
|---|------|------|
|   |      |      |
|   |      |      |
|   |      |      |
|   |      |      |

## Using the Page

- Discuss the steps illustrated for adding 28 and 16. For the second exercise, have the children trace over the broken ring around the 10 ones before they write the 2 in the ones' column and the extra 1 in the tens' column. Then let the children work independently.



## LESSON OUTCOME

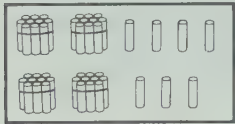
Add two-digit numbers, regrouping, sums to 99

### Materials

display board, a chart for showing tens and ones, six sets of numeral cards for 0 to 9

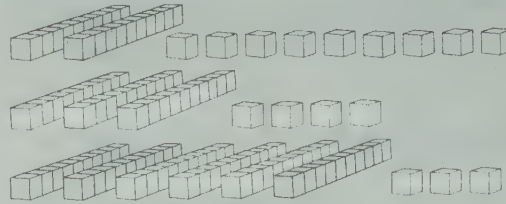
## RELATED ACTIVITIES

- You may wish to make cards showing pictures of tens and ones. Have the children select two cards, interpret how the pictures illustrate an addition exercise, and then find the sum.



| t   | o |
|-----|---|
| 4   | 7 |
| + 2 | 5 |
| 7   | 5 |

Complete.



| tens | ones |
|------|------|
| 2    | 9    |
| + 3  | 4    |
| 6    | 3    |

| t   | o |
|-----|---|
| 2   | 9 |
| + 3 | 4 |
| 6   | 3 |

|  |  |  |  |  |
|--|--|--|--|--|
| $\begin{array}{r} \text{t} \text{ o} \\ 38 \\ + 16 \\ \hline 54 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 35 \\ + 25 \\ \hline 60 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 27 \\ + 24 \\ \hline 51 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 17 \\ + 18 \\ \hline 35 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 15 \\ + 79 \\ \hline 94 \end{array}$ |
| $\begin{array}{r} \text{t} \text{ o} \\ 45 \\ + 26 \\ \hline 71 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 29 \\ + 56 \\ \hline 85 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 28 \\ + 48 \\ \hline 76 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 54 \\ + 37 \\ \hline 91 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 37 \\ + 37 \\ \hline 74 \end{array}$ |
| $\begin{array}{r} \text{t} \text{ o} \\ 48 \\ + 34 \\ \hline 82 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 19 \\ + 68 \\ \hline 87 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 47 \\ + 15 \\ \hline 62 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 18 \\ + 33 \\ \hline 51 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 57 \\ + 26 \\ \hline 83 \end{array}$ |
| $\begin{array}{r} \text{t} \text{ o} \\ 57 \\ + 13 \\ \hline 70 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 39 \\ + 43 \\ \hline 82 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 69 \\ + 29 \\ \hline 98 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 18 \\ + 45 \\ \hline 63 \end{array}$ | $\begin{array}{r} \text{t} \text{ o} \\ 19 \\ + 57 \\ \hline 76 \end{array}$ |

158 (one hundred fifty-eight)

Adding two-digit numbers, regrouping

## LESSON ACTIVITY

### Before Using the Page

- The procedure described here refers to numeral cards used with a chart on the display board. The activity can be adapted for use with felt numerals on the flannel board or magnetic numerals on the magnetic board.

| tens | ones |
|------|------|
| 4    | 7    |
| + 3  | 5    |
|      |      |

| tens | ones |
|------|------|
| 1    | 7    |
| 4    | 7    |
| + 3  | 5    |
| 8    | 2    |

Place the numeral cards for 4 and 7 in the columns as shown and ask what number is represented. Repeat using the numeral cards for 3 and 5. Ask what the sum of 7 ones and 5 ones is, and select the two numeral cards (1 and 2) for 12. Ask how 12 ones can be renamed (1 ten 2 ones). Place the numeral card for 2 in


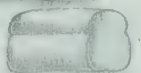
the ones' column. Ask how the new ten can be shown. Place the numeral card for 1 at the top of the tens' column. Have the children add the tens. Place the numeral card for 8 in the tens' column. Then ask, "What is the sum of 47 and 35?"

Repeat the above procedure for different pairs of addends. Have children help to place the numeral cards in the appropriate columns.

- Write on the chalkboard a few exercises having the same form as those in the preceding activity. Have the children copy and complete each exercise. Have them write the answers on the chalkboard. Discuss the results.

### Using the Page

- Discuss the example at the top of the page. Have the children ring ten ones and draw an arrow to the new group of ten. Have the children trace over the dotted numerals, discussing the reason for the dotted 1 at the top of the tens' column. Ask the children what the "t" and "o" represent at the top of the second form for the exercise. Then let the children work independently. You may wish to specify the number of exercises to be completed.

Sold 29 sSold 43 sHow many s in all?

|  |   |
|--|---|
| $\begin{array}{r} \text{tens} & \text{ones} \\ 29 & \\ +43 & \\ \hline 72 & \end{array}$ | $\begin{array}{r} 29 \\ +43 \\ \hline 72 \end{array}$ |
|--|---|

Complete.

|  |   |
|--|---|
| $\begin{array}{r} \text{tens} & \text{ones} \\ 48 & \\ +23 & \\ \hline 71 & \end{array}$ | $\begin{array}{r} 48 \\ +23 \\ \hline 71 \end{array}$ |
|--|---|

|  |   |
|--|---|
| $\begin{array}{r} \text{tens} & \text{ones} \\ 37 & \\ +28 & \\ \hline 65 & \end{array}$ | $\begin{array}{r} 37 \\ +28 \\ \hline 65 \end{array}$ |
|--|---|

$$\begin{array}{r} 55 \\ +19 \\ \hline 74 \end{array}$$

$$\begin{array}{r} 32 \\ +18 \\ \hline 50 \end{array}$$

$$\begin{array}{r} 34 \\ +58 \\ \hline 92 \end{array}$$

$$\begin{array}{r} 29 \\ +52 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 82 \\ +8 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 39 \\ +39 \\ \hline 78 \end{array}$$

$$\begin{array}{r} 18 \\ +37 \\ \hline 55 \end{array}$$

$$\begin{array}{r} 46 \\ +34 \\ \hline 80 \end{array}$$

$$\begin{array}{r} 17 \\ +46 \\ \hline 63 \end{array}$$

$$\begin{array}{r} 47 \\ +7 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 26 \\ +26 \\ \hline 52 \end{array}$$

$$\begin{array}{r} 46 \\ +25 \\ \hline 71 \end{array}$$

$$\begin{array}{r} 29 \\ +38 \\ \hline 67 \end{array}$$

$$\begin{array}{r} 16 \\ +59 \\ \hline 75 \end{array}$$

$$\begin{array}{r} 55 \\ +35 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 23 \\ +67 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 36 \\ +4 \\ \hline 40 \end{array}$$

$$\begin{array}{r} 48 \\ +45 \\ \hline 93 \end{array}$$

$$\begin{array}{r} 68 \\ +8 \\ \hline 76 \end{array}$$

$$\begin{array}{r} 19 \\ +61 \\ \hline 80 \end{array}$$



Using the standard form for addition



(one hundred fifty-nine) 159

## LESSON OUTCOME

- Use the standard form for adding two-digit numbers, regrouping, sums to 99

## RELATED ACTIVITIES

- Since addition facts having sums to 18 are an important prerequisite for skills in adding two-digit numbers, you may wish to have the children play the game "Addisnap". Children play in pairs using a set of 40 cards made up of four cards for each of the numbers from 0 to 9. The cards are shuffled and dealt equally. Each player turns over her/his top card at the same time. The first player to name the sum of the two numbers shown claims both cards. In the event of a tie, two more cards are exposed and the winner of the new pair claims the four cards exposed. The player who captures all the cards is the winner.

## LESSON ACTIVITY

## Before Using the Page

- At this time children are introduced to the standard algorithm for adding two-digit numbers.

Write an exercise on the chalkboard similar to the one at the top of page 158. Have the children copy and complete it. Have a child show the work on the chalkboard and explain how the sum is found as he/she writes the numerals. Afterward, have a child make a statement about the two addends and their sum; for example, "Nineteen plus twenty-six equals forty-five."

Explain to the children that the headings "t" and "o" are not really necessary, nor is the vertical line separating the numerals into two columns. Rewrite the exercise on the chalkboard in the standard form. Find the sum of the two numbers, relating each step to those that were used the first time.

Write a different exercise in the standard form and have children help to find the sum. Then write several exercises for the children to copy and attempt on their own. Have children write the sums on the chalkboard and explain the procedure used.

## Using the Page

- Have a child read the word problem at the top of the page. Discuss the two forms of the solution shown.

Have a child read the addends in the first of the two frames and make up a story using these numbers. Have the children write the sum using the standard form. Repeat the procedure for the next exercise. Then let the children work independently.

- After the children have completed the required number of exercises, you may wish to have them make up stories to illustrate some of them. You may also wish to ask questions similar to the following:

"Look at the third row. How many sums have a 7 in the tens' place?"

"Look at the second row. How many sums have a 5 in the ones' place?"

"Look at the last exercise in the first row. Why are there 9 tens in the sum?"

"Look at the first exercise in the second row. Why does the sum have 7 tens when there are only 3 tens and 3 tens in the addends?"



## LESSON OUTCOME

Add two-digit numbers, regrouping, sums to 99

### Materials

number line, hundred chart

## RELATED ACTIVITIES

• You may wish to have the children follow instructions similar to the following for the sums obtained in the three rows for the second part of the page.

“Ring in red the sums that show 8 in the tens’ place. How many did you ring?”

“Ring in blue the sums that show 9 in the ones’ place. How many did you ring?”

“Which sum is ringed in red and in blue? Why?”

“Ring in green the greatest sum.”

“Ring in purple the least sum.”

“Use a ✓ to mark the sums that have the same digit in the tens’ place as in the ones’ place. How many sums did you mark?”

Complete.

|   |   |   |   |  |
|---|---|---|---|--|
| $\begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$  | $\begin{array}{r} 10 \\ + 5 \\ \hline 15 \end{array}$ | $\begin{array}{r} 15 \\ + 6 \\ \hline 21 \end{array}$ | $\begin{array}{r} 21 \\ + 7 \\ \hline 28 \end{array}$ | $\begin{array}{r} 28 \\ + 8 \\ \hline 36 \end{array}$  |
| $\begin{array}{r} 9 \\ + 5 \\ \hline 14 \end{array}$  | $\begin{array}{r} 14 \\ + 6 \\ \hline 20 \end{array}$ | $\begin{array}{r} 20 \\ + 7 \\ \hline 27 \end{array}$ | $\begin{array}{r} 27 \\ + 8 \\ \hline 35 \end{array}$ | $\begin{array}{r} 35 \\ + 9 \\ \hline 44 \end{array}$  |
| $\begin{array}{r} 12 \\ + 6 \\ \hline 18 \end{array}$ | $\begin{array}{r} 18 \\ + 7 \\ \hline 25 \end{array}$ | $\begin{array}{r} 25 \\ + 8 \\ \hline 33 \end{array}$ | $\begin{array}{r} 33 \\ + 9 \\ \hline 42 \end{array}$ | $\begin{array}{r} 42 \\ + 10 \\ \hline 52 \end{array}$ |

Add.

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| $\begin{array}{r} 34 \\ + 28 \\ \hline 62 \end{array}$ | $\begin{array}{r} 42 \\ + 7 \\ \hline 49 \end{array}$  | $\begin{array}{r} 19 \\ + 14 \\ \hline 33 \end{array}$ | $\begin{array}{r} 68 \\ + 1 \\ \hline 69 \end{array}$  | $\begin{array}{r} 57 \\ + 28 \\ \hline 85 \end{array}$ | $\begin{array}{r} 69 \\ + 22 \\ \hline 91 \end{array}$ |
| $\begin{array}{r} 25 \\ + 19 \\ \hline 44 \end{array}$ | $\begin{array}{r} 65 \\ + 34 \\ \hline 99 \end{array}$ | $\begin{array}{r} 48 \\ + 28 \\ \hline 76 \end{array}$ | $\begin{array}{r} 39 \\ + 36 \\ \hline 75 \end{array}$ | $\begin{array}{r} 53 \\ + 36 \\ \hline 89 \end{array}$ | $\begin{array}{r} 85 \\ + 8 \\ \hline 93 \end{array}$  |
| $\begin{array}{r} 55 \\ + 15 \\ \hline 70 \end{array}$ | $\begin{array}{r} 49 \\ + 33 \\ \hline 82 \end{array}$ | $\begin{array}{r} 27 \\ + 29 \\ \hline 56 \end{array}$ | $\begin{array}{r} 14 \\ + 26 \\ \hline 40 \end{array}$ | $\begin{array}{r} 19 \\ + 69 \\ \hline 88 \end{array}$ | $\begin{array}{r} 17 \\ + 76 \\ \hline 93 \end{array}$ |

160 (one hundred sixty)

Addition practice: sums to 99

## LESSON ACTIVITY

### Before Using the Page

• Write on the chalkboard a few addition exercises having two addends, some of which do not require regrouping when finding the sum. Discuss the exercises with the children, reviewing such things as reading the standard numeral, expressing a two-digit number as a number of tens and some ones, renaming more than nine ones as tens and ones, recording the new ten from renaming the ones.

Complete the same exercises on the number line or by using the hundred chart. Compare the sums with those obtained earlier.

• Since the page provides exercises involving two-digit numbers, you may wish to have the children practise expressing numbers from 11 to 19 as tens and ones by playing the game “Teen Numbers”, described on page T217, in groups of four players.

### Using the Page

• Discuss the example at the top of the page with the children. Ask what is the sum of 6 and 4. Have the children trace over the dotted 10. Draw attention to the arrow leading from the sum, 10, to the position of the first addend in the second exercise. Have the children trace over the dotted 10 in the second exercise. Ask the children to print the sum for the second exercise. Then ask what the first addend in the third exercise should be. When the children understand the procedure, let them work independently. However, point out that the last exercise in each row will help them to check that their own work is correct.

• The second part of the page provides practice in addition. Note that a few of the exercises do not involve regrouping. You may wish to indicate the number of exercises that children at a certain level are to complete.

## LESSON OUTCOME

Compare the capacity of a container with that of a one-litre container

## Materials

various containers of different sizes, one-litre containers labelled as such, the containers illustrated on the page or suitable substitutes, materials for filling containers (peas, rice, sand, water)

## Vocabulary

litre (L)

## RELATED ACTIVITIES

• Filling and pouring tasks can be written on cards and placed in an envelope beside the capacity table in the classroom. Children can use these in their spare time. Two examples are shown below.

Find a large container and a small container. How many small containers will fill the large one?

Find five containers having different sizes and shapes. Place them in order to show which you think holds the most to which holds the least. Measure to check.

• You may wish to have children use a one-litre container to measure the capacity of larger containers to the nearest litre.

Ring the containers that hold more than a litre.



SKIM MILK



Answers will vary.



Check the containers that hold less than a litre.



Comparing capacities to one litre

(one hundred sixty-one) 161

## LESSON ACTIVITY

## Before Using the Page

- Have the children bring from home a variety of jars, plastic tubs, jugs, cans, and bottles suitable for measuring capacity. Collect as many containers as possible that have a capacity of exactly one litre. These containers may be collected and displayed in one part of the classroom for about a week before this lesson is presented.
- Display a one-litre container marked with the label "one litre" and also "1 L". Introduce the word *litre* and, if you wish, the symbol "L". Print them on the chalkboard. Emphasize that the symbol "L" is always read as "litre" or "litres". Fill the one-litre container with water and say to the children, "This is one litre of water." Ask questions similar to the following:
  - "Is one litre of water enough to water the lawn?"
  - "Is one litre of water enough for a plant?"
  - "Is one litre of water enough for a drink?"
  - "Is one litre of water enough for a swim?"
  - "Is one litre of water enough for bathing a baby?"

Discuss things that are sold by the litre (juice, ice cream, milk, vinegar, bleach, gasoline, motor oil).

- Have the children work in small groups at the capacity table. Have them use liquids or dry materials (peas, rice, sand) for filling or pouring activities. Have them find and identify containers that hold less than one litre, about the same as one litre, and more than one litre. Children find it easier to record their answers if containers are labelled in some way, for example, with capital letters or numerals.

## Using the Page

- The capacity of each of the nine containers shown on the page is to be compared with the capacity of a one-litre container. Children are to locate each container illustrated, fill it with water (or sand) and pour part or all of the contents into the one-litre container. If the containers illustrated are not readily available, substitute others having similar capacities.



LESSON OUTCOME

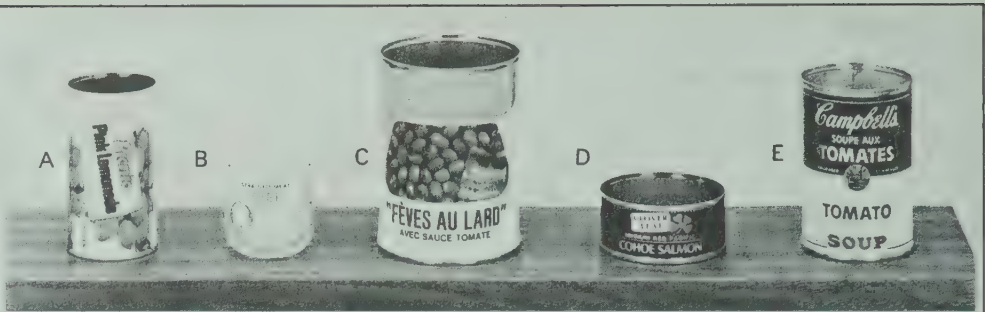
Estimate how many of a given container are equivalent to one litre; measure to check an estimate of capacity

Materials

various containers in different sizes, one-litre containers, prepared charts for recording results, the containers illustrated on the page or suitable substitutes, materials for filling containers (peas, rice, sand, water)

RELATED ACTIVITIES

- You may wish to have the children make charts showing pictures of containers that hold less than one litre, more than one litre, and about one litre.
- You may wish to have children help to mix a drink from a can of frozen concentrate. Discuss whether the amount of drink obtained is more than or less than one litre. Discuss how many children may receive one drink (use a small paper cup as the unit of capacity) and what the cost is for one child. Then on another day, repeat the procedure beginning with a package of dry mix and compare the results.
- You may wish to introduce containers with capacities of one-half and one-fourth of a litre. Have children experiment to find the answers to such questions as, "How many jars are needed to fill the one-litre container? the half-litre container? the one-fourth litre container?"



Answers will vary.

How many do you need for one litre?

|   | Estimate    | Measurement |
|---|-------------|-------------|
| A | about _____ | about _____ |
| B | about _____ | about _____ |
| C | about _____ | about _____ |
| D | about _____ | about _____ |
| E | about _____ | about _____ |

LESSON ACTIVITY

Before Using the Page

- After the children have had an opportunity to carry out many filling and pouring tasks involving one litre, they should be encouraged to fill a one-litre container from smaller containers. Work with the children in small groups. Have each child, in turn, fill a container while the others in the group count how many small containers are used to fill the one-litre container. Have each child make a record of the results.
- Children should be encouraged to make and record their own estimates before a measurement is made. Prepared charts will help the children to keep neat records of the results.

| How many fill one litre? |          |             |
|--------------------------|----------|-------------|
| Container                | Estimate | Measurement |
| A                        |          |             |
| B                        |          |             |
| C                        |          |             |
| D                        |          |             |

Using the Page

- Assemble the containers illustrated on the page or substitute others having similar capacities. Before the children do the measuring you should determine how many of each are needed to fill one litre. The children may work together in small groups. Each child should record her/his own estimate first. Then all the children in the group help to count the containers needed to fill the one-litre container as one child performs the task of filling and pouring.

## LESSON OUTCOME

Add three one-digit numbers, sums to 18.

## Materials

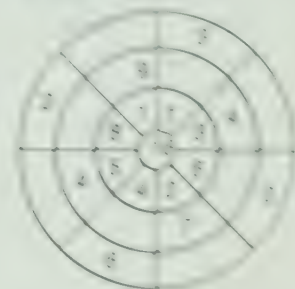
display board and cutouts, flash cards showing addition facts having sums to 18.

## RELATED ACTIVITIES

- Children can practice finding the sum of three numbers using three dice: the first marked 1, 2, 3, 4, 5 the second marked 4, 5, 6, 4, 5, 6 and the third marked 7, 8, 9, 7, 8, 9.

Have the children roll the dice to obtain three numbers to be written as an addition sentence and then calculate the sum. You may wish to stipulate the number of addition sentences each child is to complete for this activity according to her/his level of ability.

- You may wish to prepare one or more number wheels having one of three addends missing for sums to 18. Have the children complete the number wheels by writing the missing addends in the appropriate spaces.



Adding three one-digit numbers, sums to 18

|  |  |  |  |  |
|--|--|--|--|--|
| $\begin{array}{r} 2 \\ 3 \\ + 6 \\ \hline \end{array}$ | $\begin{array}{r} 4 \\ 5 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 2 \\ 1 \\ + 9 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ |
| $\begin{array}{r} 3 \\ 6 \\ + 5 \\ \hline \end{array}$ | $\begin{array}{r} 8 \\ 2 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 9 \\ 0 \\ + 5 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ |
| $\begin{array}{r} 5 \\ 1 \\ + 6 \\ \hline \end{array}$ | $\begin{array}{r} 4 \\ 4 \\ + 6 \\ \hline \end{array}$ | $\begin{array}{r} 7 \\ 3 \\ + 5 \\ \hline \end{array}$ | $\begin{array}{r} 8 \\ 1 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ |
| $\begin{array}{r} 6 \\ 2 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 6 \\ 0 \\ + 8 \\ \hline \end{array}$ | $\begin{array}{r} 4 \\ 1 \\ + 3 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ |
| $\begin{array}{r} 3 \\ 4 \\ + 5 \\ \hline \end{array}$ | $\begin{array}{r} 5 \\ 3 \\ + 6 \\ \hline \end{array}$ | $\begin{array}{r} 9 \\ 0 \\ + 5 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ | $\begin{array}{r} 1 \\ 1 \\ + 7 \\ \hline \end{array}$ |

$3 + 5 + 9 = 17$        $7 + 11 + 4 = 22$   
 $2 + 8 + 6 = 16$        $4 + 2 + 9 = 15$

## LESSON ACTIVITY

## Before Using the Page

- Begin with a quick review of basic addition facts having sums to 18. You may state the facts orally or use flash cards and have the children write their answers. Encourage a quick response by setting a pace according to the level at which the children are working.
- You may wish to review the associative property of addition by using three sets of cutouts on the display board. Have the children count the cutouts in each set and write the numerals on the chalkboard. Find the sum of the numbers by grouping in two different ways, illustrating the grouping used with the cutouts on the display board. (See page T52.)
- Write several addition exercises having three addends in horizontal and vertical form on the chalkboard. Discuss three or four exercises with the children, illustrating the procedure of adding the numbers from top to bottom to obtain the sum for the vertical form, and checking the sum by adding the numbers from bottom to top. For the horizontal form, have the children add from left

to right to obtain the sum, and add from right to left to check the answer.

- Use several pairs of exercises similar to the following to prepare the children for applying extensions of basic facts in adding three numbers. Encourage rapid oral responses.

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| $\begin{array}{r} 2 \\ + 4 \\ \hline 6 \end{array}$ | $\begin{array}{r} 12 \\ + 4 \\ \hline 16 \end{array}$ | $\begin{array}{r} 3 \\ + 5 \\ \hline 8 \end{array}$ | $\begin{array}{r} 13 \\ + 5 \\ \hline 18 \end{array}$ | $\begin{array}{r} 1 \\ + 3 \\ \hline 4 \end{array}$ | $\begin{array}{r} 11 \\ + 3 \\ \hline 14 \end{array}$ |
|---|---|---|---|---|---|

## Using the Page

- Have the children begin the page without preliminary discussion.

You may wish to ask the children how many exercises there are on the page. Observe those who use the method of counting by fives for the five rows of five, and then adding four.



LESSON OUTCOME

Add amounts of money, regrouping, sums to 99 cents

Materials



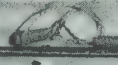


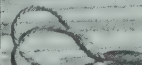




real money, play money, or coin cutouts from copies of page T327, flash cards showing amounts to 99¢

RELATED ACTIVITIES

- After the children have completed the page, ask these questions:  
“Which pair of toys costs the most?  
How much do they cost?”  
“Which pair of toys could I buy for the least amount of money?”  
“Which two purchases cost the same amount of money?”
- Provide newspapers and catalogues for the children. Tell the children they have an amount of money to spend (less than 99 cents) and ask them to determine pairs of items that could be bought.
- Some children may be ready for adding three two-digit numbers. Have these children “buy” the following sets of toys and determine the total price.
  - ball, top, airplane
  - ball, top, truck
  - ball, top, blocks
  - ball, doll, blocks
  - top, doll, blocks
  - rope, doll, blocks

15¢ 35¢ 47¢ 28¢ 36¢ 54¢ 9¢

Complete.

| I buy   | I spend  | I buy  | I spend  |
|---|--|--|--|
|    | $\begin{array}{r} 15 \\ + 36 \\ \hline 51 \end{array}$ ¢ |    | $\begin{array}{r} 47 \\ + 9 \\ \hline 56 \end{array}$ ¢  |
|    | $\begin{array}{r} 35 \\ + 28 \\ \hline 63 \end{array}$ ¢ |   | $\begin{array}{r} 35 \\ + 36 \\ \hline 71 \end{array}$ ¢ |
|    | $\begin{array}{r} 47 \\ + 36 \\ \hline 83 \end{array}$ ¢ |    | $\begin{array}{r} 54 \\ + 36 \\ \hline 90 \end{array}$ ¢ |
|    | $\begin{array}{r} 15 \\ + 35 \\ \hline 50 \end{array}$ ¢ |   | $\begin{array}{r} 54 \\ + 9 \\ \hline 63 \end{array}$ ¢  |
|  |  |  |  |

164 (one hundred sixty-four)

Adding with money, regrouping, amounts to 99 cents

LESSON ACTIVITY

Before Using the Page

- Although the children are familiar with the four kinds of coins (penny, nickel, dime, quarter), it is suggested that using dimes and pennies alone at this time will help to reinforce the concept of tens and ones. Display sets of dimes and pennies for amounts to 99 cents. Have children determine the value of each set of coins.
- Display cards showing amounts of money to 99¢ and have children use dimes and pennies to represent these amounts.
- Display a card showing the price 27¢. Have the children represent this amount using dimes and pennies. Display a card showing the price 35¢ and have the children use more dimes and pennies to show this amount in a separate group. Have them join the two sets of coins, state the number of dimes and the number of pennies, and lead them to suggest that 10 pennies can be exchanged for one dime. Have them make the exchange and state the number of each kind of coin and the amount of money. Write the results on the chalkboard as shown.

|           |            |
|-----------|------------|
| 2 dimes   | 7 pennies  |
| + 3 dimes | 5 pennies  |
| 5 dimes   | 12 pennies |
| 6 dimes   | 2 pennies  |
|           | 62¢        |

- Repeat the procedure for the previous activity for different amounts of money. Then have the children reconsider each as an addition exercise as follows:  
“What is the value of 2 dimes 7 pennies?”  
Write 27¢.  
“What is the value of 3 dimes 5 pennies?”  
Write 35¢ and +.  
Have the children copy and complete the exercise. Review the procedure of writing the new 1 ten from regrouping.

Using the Page

- Have children identify the items pictured at the top of the page (ball, top, truck, airplane, skipping rope, doll, blocks) and their prices. Discuss the first exercise and then let the children work independently.

Solve each problem.  
Show your work.

$$\begin{array}{r} 27 \\ + 8 \\ \hline 35 \end{array}$$

How many in all?

35

$$\begin{array}{r} 49 \\ + 16 \\ \hline 65 \end{array}$$

How many in all?

65

$$\begin{array}{r} 39 \\ + 49 \\ \hline 88 \end{array}$$

How many in all?

88

$$\begin{array}{r} 26 \\ + 36 \\ \hline 62 \end{array}$$

How many in all?

62

$$\begin{array}{r} 18 \\ + 35 \\ \hline 53 \end{array}$$

How many in all?

53

$$\begin{array}{r} 36 \\ + 38 \\ \hline 74 \end{array}$$

How many in all?

74



Solving problems involving addition with regrouping

(one hundred sixty-five) 165

## LESSON OUTCOME

Solve problems involving addition, regrouping, sums to 99

### Materials

objects in the classroom suitable for counting, sheets of paper or cards for writing problems to be solved

## RELATED ACTIVITIES

- Write several addition exercises on the chalkboard. Ask each child to choose one. Have each child write a story using the addends and then find the sum.

## LESSON ACTIVITY

### Before Using the Page

• For this activity, it may be necessary to arrange objects that can be counted in the classroom. Work with the children in small groups and assign various counting tasks similar to the one described here. These may be done two or three days before the page is assigned.

Have one child count the boys in the class and another child count the girls. Then ask the two children to find out how many children there are in the class, without counting; that is, by adding the numbers they have already obtained. When they have finished, help them to show the information for the problem on a card, so that other children can use their information to solve the same problem. From this procedure, many problem cards can be obtained for other children to use, and the problems will relate to the environment of the children. Some examples are given.

1. John counted 16 boys in our class.

Susan counted 15 girls in our class.

How many children are there in our class?

2. Ann counted 37 red blocks in the box.

Ed counted 48 green blocks in the box.

How many of these blocks are there in the box?

3. Kim bought 2 cans of cat food.

One can cost 24¢. The other can cost 39¢.

How much did Kim pay for the cat food?

4. Mike and Tony counted the cars in the parking lot.

Mike counted the cars with two doors. There were 15.

Tony counted 26 cars with four doors.

How many cars were there in the parking lot?

Distribute the problem cards to small groups of children or present problems orally. Have children demonstrate on the chalkboard how they solved each problem.

### Using the Page

- Have children look at the page and identify the objects illustrated. Ask the children to show their work in the upper right corner of each yellow region. After the children have completed the problems, have them read the problems aloud and explain the solutions.



## LESSON OUTCOME

Measure length in centimetres

### Materials

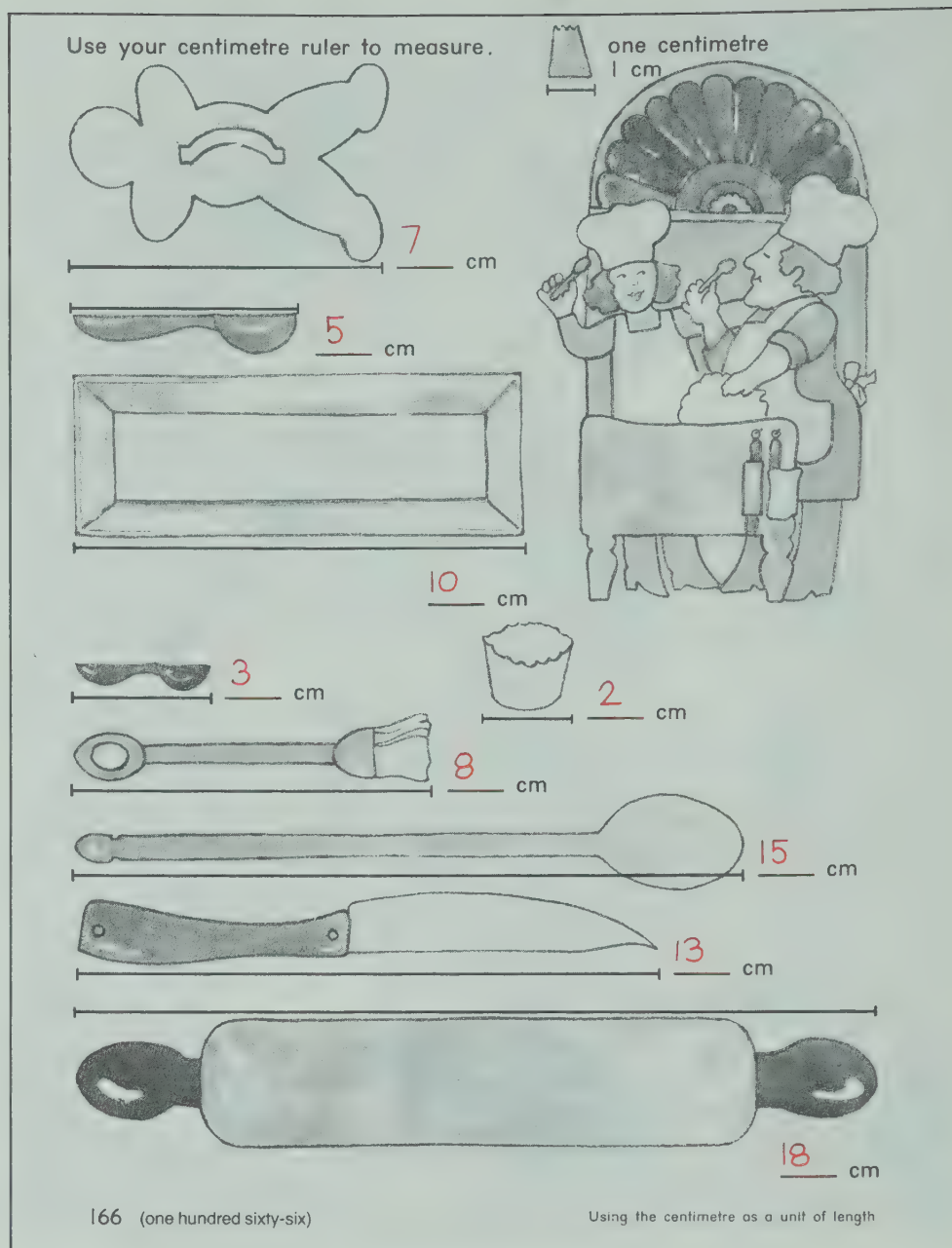
unmarked metre sticks, decimetre strips from page T339 for each child, centimetre cubes or copies of centimetre strips from page T344, objects to be measured in centimetres, centimetre rulers or copies of page T340

### Vocabulary

centimetre (cm)

## RELATED ACTIVITIES

- Continue to have the children measure various lengths using their centimetre rulers. If you used the activity in *Related Activities* given on page T180, you may wish to have the children determine the number of centimetres in each of these lengths. At the same time, help each child to cut a strip of paper to match her/his height. Have the children determine their heights in centimetres.
- If you have interlocking centimetre cubes, have children fit these together and place the long strip beside the metre stick to emphasize that 100 of the cubes fit the metre stick. You may wish to compare the cent and the centimetre:  
100 cents are equivalent to one dollar;  
100 centimetres are equivalent to one metre.



166 (one hundred sixty-six)

Using the centimetre as a unit of length

## LESSON ACTIVITY

### Before Using the Page

- Review the metre by asking the children to recall some of the lengths that were measured with the metre stick. Have the children tell why it would not be easy to measure the length of a pencil with the metre stick.
- Have the children review or rediscover the number of decimetre strips that fit the metre stick. (See page T180.) Ask the children to recall some of the objects the lengths (or circumferences) of which were measured with the decimetre strip. Ask them to name some objects that were shorter than the decimetre strip.
- Have the children place centimetre cubes along their decimetre strips to discover how many will fit the length of the strip. Introduce the word *centimetre* and the symbol "cm". Print them on the chalkboard. Emphasize that the symbol "cm" is always read as "centimetre" or "centimetres". Ask the children if they can see a familiar word in *centimetre*. They may suggest *metre* or *cent*.

Have the children use a centimetre cube to mark off cen-

timetre lengths on the decimetre strip. This is not the easiest task for small hands, so you may prefer to make copies of page T344 and cut centimetre strips for the children to paste on their decimetre strips. Also, prepare strips 10 cm in length and have children tape them end to end along an unmarked metre stick. Then have children count by tens to discover how many centimetres there are in one metre.

- Have the children try to find objects that measure about one centimetre, for example, the width of a thumbnail or a thumbtack.
- Give each child a ruler marked in centimetres. (You may prefer to use copies of page T340.) Show the children how to place an object along the ruler with one end aligned at zero, and read the length of the object. Have them measure the lengths of several objects in the classroom, for example, a book, a pencil.

### Using the Page

- Have the children use their centimetre rulers to measure the lengths of the various cooking utensils pictured on the page. Watch the children as they work to see that the rulers are being lined up correctly.

## LESSON OUTCOME

Measure length to the nearest centimetre

## Materials

metre sticks, centimetre rulers or copies of page T340

## Vocabulary

line segment

## RELATED ACTIVITIES

- Children may use a copy of page T342 and draw over the grid lines to show line segments from 1 cm to 15 cm in length.

Measure to the nearest centimetre.



one centimetre  
1 cm

between 4 cm and 5 cm

about 5 cm



between 8 cm and 9 cm

about 8 cm



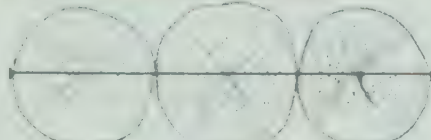
between 14 cm and 15 cm

about 15 cm



between 10 cm and 11 cm

about 11 cm



between 9 cm and 10 cm

about 9 cm



between 13 cm and 14 cm

about 13 cm

Measuring to the nearest centimetre

(one hundred sixty-seven) 167

## LESSON ACTIVITY

## Before Using the Page

- Review the words *metre*, *decimetre*, *centimetre*, and the fact that a metre contains 10 dm or 100 cm.
- Print the term *line segment* on the chalkboard. Draw two dots on the chalkboard and label them A and B. Use a metre stick to join the two dots. Tell the children that you have drawn a line segment, and that the name of the line segment is AB or BA. Mention that capital letters are usually used to name line segments. Have children help to measure in centimetres the length of the line segment. Write the measure above the line segment.
- Demonstrate on the chalkboard how to draw a line segment of a given length, for example, 30 cm. Holding a ruler against the chalkboard, show how a dot is drawn at zero and another at 30. Join the two dots (end points) using the edge of the ruler as a guide. Label the end points C and D. Write the length of line segment CD above it (30 cm).
- Write the information shown below on the chalkboard and have the children draw and label the line segments. After they

have finished, they may exchange papers to check one another's work. As they do, remind them to align the zero mark of the ruler with one end point of the line segment.

EF 5 cm GH 3 cm IJ 12 cm KL 9 cm

- Prepare work sheets showing line segments that are not an exact number of centimetres in length. Have the children align their rulers with one end of the first line segment and lead them to observe that the length is between (5) cm and (6) cm. Ask if the length of the line segment is closer to (5) cm or to (6) cm. Have the children write the lengths as "about (6) cm".
- Have the children measure the lengths of various objects in the classroom. Ask questions about the length of each object. If the children suggest that the length of an object seems to be exactly half way between two centimetre marks on the ruler, tell them to choose the greater of the two numbers at this time.

## Using the Page

- Have the children use their centimetre rulers to measure to the nearest centimetre the bakery items shown. Again, watch to see that the children align their rulers with zero.



## LESSON OUTCOME

Measure in centimetres the sides of a geometric shape

### Materials

cardboard shapes (triangle, square, rectangle) or attribute blocks, centimetre rulers

### Vocabulary

quadrilateral (optional)

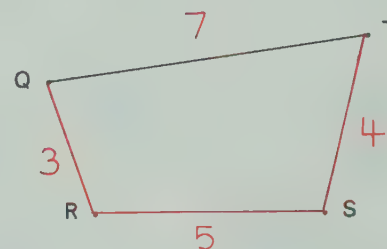
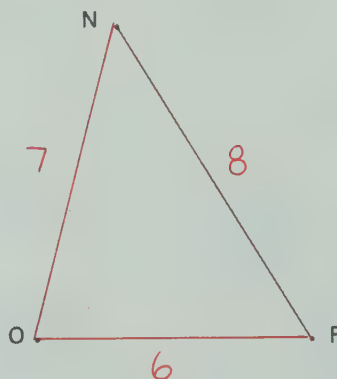
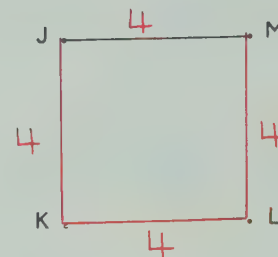
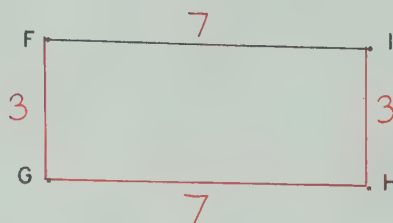
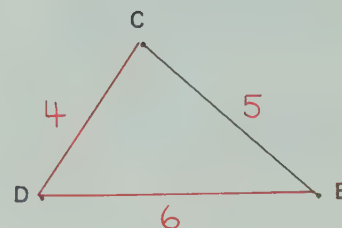
## RELATED ACTIVITIES

- Draw a picture similar to the one shown below. Have the children measure and mark the length of each line segment in the picture.



- You may wish to have the children draw line segments as described on page T217.

Connect the dots to complete each shape.  
Measure each line segment in centimetres.  
Show the number of centimetres.



168 (one hundred sixty-eight)

Measuring sides of geometric shapes

## LESSON ACTIVITY

### Before Using the Page

- Display cardboard shapes or attribute blocks and have children identify the triangular, square, and rectangular shapes. Have children state the number of sides and the number of corners for each shape and tell what distinguishes a square from a rectangle.
- On the chalkboard, draw three dots to represent the vertices of a triangle. Join the dots without using a straight edge as a guide. Ask the children what shape is suggested and why it is not a good representation of a triangle. Lead the children to suggest that the sides should be straight. Ask the children to suggest how you could make the sides straight.

Erase the freehand line segments, label the dots with capital letters as shown, and use a ruler to join the dots. Ask the children what shape is shown. Ask how many line segments there are and have the children name the line segments (AB, BC, CA). Have children help to measure in centimetres the three line segments and write the numerals beside the line segments.

- On the chalkboard, draw four dots to represent the vertices of

a square and label them D, E, F, and G. Join the dots labelled D and G. Have a child tell the name of the line segment (DG or GD). Ask how many more line segments could be drawn if alphabetical order were followed for joining pairs of dots. Have children help to join the dots and then measure and record in centimetres the length of each line segment.



### Using the Page

- Discuss with the children how they are to proceed on the page. Have them name each line segment shown, tell how many more line segments can be drawn by following alphabetical order, and tell what the shape will likely be. The last diagram will require some discussion because it has four sides, but it is neither a square nor a rectangle. You may wish to introduce the word *quadrilateral*, which refers to any polygon having four sides. If not, simply call it a four-sided shape.

**OBJECTIVE**

Add two-digit numbers, regrouping, sums to 99

**Materials**

cross-number puzzle on squared paper or cardboard

**Vocabulary**

cross-number puzzle

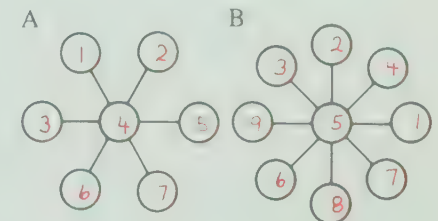
**RELATED ACTIVITIES**

• Children may enjoy working with other number puzzles. Two are given below.

1. Have the children try to place the numbers from 1 to 7 in the circles (A) so that the sum of the numbers in three connected circles is 12.

If you feel that children need a clue, arrange the numbers in a row: 1 2 3 4 5 6 7. Ask which number should be placed in the circle at the centre. Lead the children to suggest that it would be natural for the middle number in the row to be placed in the centre.

2. Have the children try to place the numbers from 1 to 9 in the circles (B) so that the sum of the numbers in three connected circles is 15.



Add. Complete the puzzle.

| Across             |                    |                    | Down               |                    |                    |
|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| A 31<br>+ 4<br>35  | B 44<br>+ 8<br>52  | C 27<br>+ 26<br>53 | A 29<br>+ 6<br>35  | B 27<br>+ 28<br>55 | C 35<br>+ 15<br>50 |
| D 23<br>+ 39<br>62 | E 33<br>+ 4<br>37  | G 23<br>+ 6<br>29  | D 15<br>+ 46<br>61 | F 60<br>+ 10<br>70 | H 45<br>+ 53<br>98 |
| I 85<br>+ 10<br>95 | K 19<br>+ 27<br>46 | M 26<br>+ 48<br>74 | J 28<br>+ 28<br>56 | L 25<br>+ 38<br>63 | M 26<br>+ 53<br>79 |
| N 49<br>+ 39<br>88 | O 65<br>+ 16<br>81 | P 48<br>+ 42<br>90 | N 34<br>+ 46<br>80 | O 59<br>+ 25<br>84 | P 56<br>+ 37<br>93 |

|     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A 3 | 5   |     | B 5 | 2   |     | C 5 | 3   |     | D 6 | 2   |     |
| 5   |     |     | 5   |     |     | 0   |     |     | 1   |     |     |
|     | E 3 | F 7 |     | G 2 | H 9 |     | I 9 | J 5 |     | K 4 | L 6 |
|     |     | 0   |     |     | 8   |     |     | 6   |     |     | 3   |
| M 7 | 4   |     | N 8 | 8   |     | O 8 | 1   |     | P 9 | 0   |     |
| 9   |     |     | 0   |     |     | 4   |     |     | 3   |     |     |

Addition practice: sums to 99 (one hundred sixty-nine) 169

**LESSON ACTIVITY****Before Using the Page**

• Draw the cross-number puzzle shown on page T217 on a large sheet of squared paper or cardboard, and write the accompanying fourteen addition exercises on the chalkboard.

Have a child select one exercise, add the numbers, and write the sum on the chalkboard. Point to the word *Across* or *Down*, according to the exercise selected by the child, and the letter of the alphabet associated with the exercise. Show the children how to find the corresponding squares in the puzzle. Ask the child who found the sum to write the digits of the number in the proper squares. Have other children, in turn, select an exercise, find the sum, and write the sum in the puzzle. If all the squares of the puzzle are filled before all the sums have been found, continue to find the sums and point out how these are used to check the numbers already written.

**Using the Page**

• Let the children work independently. Give assistance to any children who may have difficulty locating the appropriate

squares in the puzzle in which a particular sum is to be written. The children may find the sums in whichever order they prefer. Note that a few of the exercises do not require regrouping. This will enable you to determine which children tend to show an extra ten when the addition does not involve regrouping.



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## Materials

flash cards showing tens and ones for renaming, flip chart for each child, number line, hundred chart, centimetre ruler for each child

## RELATED ACTIVITIES

- Children who had little difficulty with the number work in this unit may be interested in working at the capacity table in the classroom. Ask them to choose four large bottles or containers having different shapes. Have them try to estimate when they think they have poured one litre of water or sand into each container. Then they can check by pouring the contents of each into a one-litre container and marking the level reached.
- You may wish to have the children do one or both of the activities described for this page on page T217.

Add.

$$5 + 2 + 8 = \underline{15}$$

$$7 + 3 + 9 = \underline{19}$$

$$5 + 4 + 5 = \underline{14}$$

$$\begin{array}{r} 36 \\ + 3 \\ \hline 39 \end{array}$$

$$\begin{array}{r} 36 \\ + 4 \\ \hline 40 \end{array}$$

$$\begin{array}{r} 36 \\ + 5 \\ \hline 41 \end{array}$$

$$\begin{array}{r} 3 \\ + 7 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 13 \\ + 7 \\ \hline 20 \end{array}$$

$$\begin{array}{r} 23 \\ + 7 \\ \hline 30 \end{array}$$

Regroup to show more tens.

3 tens 10 ones

6 tens 15 ones

4 tens 0 ones

7 tens 5 ones

Add.

$$\begin{array}{r} 65 \\ + 9 \\ \hline 74 \end{array}$$

$$\begin{array}{r} 19 \\ + 8 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 39 \\ + 6 \\ \hline 45 \end{array}$$

$$\begin{array}{r} 27 \\ + 4 \\ \hline 31 \end{array}$$

$$\begin{array}{r} 29¢ \\ + 7¢ \\ \hline 36¢ \end{array}$$

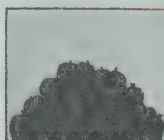
$$\begin{array}{r} 28 \\ + 25 \\ \hline 53 \end{array}$$

$$\begin{array}{r} 57 \\ + 33 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 63 \\ + 29 \\ \hline 92 \end{array}$$

$$\begin{array}{r} 49 \\ + 31 \\ \hline 80 \end{array}$$

$$\begin{array}{r} 38¢ \\ + 53¢ \\ \hline 91¢ \end{array}$$



28 apples  
36 apples  
How many in all?

64 apples



44 oranges  
26 oranges  
How many in all?

70 oranges

Measure.

---



---



---

8 cm

about 6 cm

about 10 cm

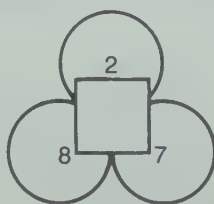
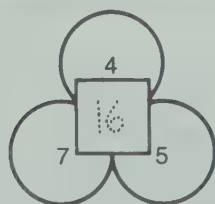
170 (one hundred seventy)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- For a review of addition with three addends, draw diagrams similar to the following on the chalkboard. Demonstrate how the sum can be found in more than one way.



- Use flash cards showing examples such as 4 tens 13 ones, 7 tens 17 ones, 3 tens 10 ones to review the renaming of numbers. Have the children respond by using their flip charts. (See page T107).
- Use exercises that do not require regrouping and then exercises that require regrouping to review addition of two-digit numbers. Use objects for grouping by tens, if necessary. The

answers can be checked by referring to the number line and to the hundred chart.

- State word problems that involve addition and have children copy the numbers and solve the problems. Some problems may involve buying two items at the store. Others may involve the theme of this unit; for example, "I went for a walk around our block. I counted 23 trees on one side of the street and 17 trees on the other side of the street. How many trees did I count?"
- Children may use their centimetre rulers to practise measuring various lengths. You may wish to have them turn to page 169 and measure the width of the puzzle. Then have them turn to page 149 and measure the height of the graph.

### Using the Page

- Discuss the purpose of this page with the children. Read the instructions with them to ensure that they know how to proceed. Then let them work independently.

## Games and Activities

### Teen Numbers (Game for page 160)

Prepare four sets of small cards for each of the numerals from 1 to 9 (36 cards), four sets of small cards for the numerals from 11 to 19 (36 cards), and four game boards as shown.

|  |
|--|
| 10 + <input type="text"/> = <input type="text"/> |
| 10 + <input type="text"/> = <input type="text"/> |
| 10 + <input type="text"/> = <input type="text"/> |
| 10 + <input type="text"/> = <input type="text"/> |

Shuffle all the cards and place them face down in front of the players. Each player in turn picks up a card and places it on her/his game board. If a player cannot place the card on the board, it is returned face up to the display of cards for other players to pick up at their turn, if they wish. Then the next player has a turn. The player who has a game board completed first is the winner.

### Activity for page 168

Prepare a work sheet showing the rays of an angle marked in centimetres from 1 to 15 as shown. Have children use their rulers to draw line segments that join dots as follows: a dot on one ray can be joined to a dot on the other ray if the sum of the numbers for the two dots is 16. In this way, the children are practising sums of 16. At the same time, they will be surprised to see how line segments can be drawn to give the appearance of a curve. Children can experiment with the same technique using angles of different sizes, or sides of squares or rectangles.



### Cross-Number Puzzle for page 169

|   |   |   |   |   |   |  |
|---|---|---|---|---|---|--|
|   | A |   |   | B |   |  |
| C |   |   | D |   | E |  |
|   |   | F |   | G |   |  |
|   | H |   |   | I |   |  |

Across

|   |     |   |      |   |      |   |      |
|---|-----|---|------|---|------|---|------|
| A | 18  | B | 27   | C | 35   | D | 28   |
|   | + 9 |   | + 32 |   | + 28 |   | + 20 |

|   |     |   |      |   |      |   |     |
|---|-----|---|------|---|------|---|-----|
| F | 13  | G | 16   | H | 26   | I | 19  |
|   | + 4 |   | + 28 |   | + 27 |   | + 9 |

Down

|   |     |   |      |   |      |   |     |
|---|-----|---|------|---|------|---|-----|
| A | 14  | B | 19   | C | 34   | D | 39  |
|   | + 9 |   | + 39 |   | + 28 |   | + 8 |

|   |      |   |     |   |      |
|---|------|---|-----|---|------|
| E | 59   | F | 11  | G | 32   |
|   | + 35 |   | + 2 |   | + 16 |

### Domino Addition (Activity for page 170)

Dominoes or domino cards can be used to practise addition with or without regrouping. To eliminate any possibility of regrouping tens as hundreds, the domino pieces or cards should be placed to represent numbers less than 50. Note that one domino in the example below is turned around to represent 46 instead of 64.

Place the domino pieces or cards in a bag or a box. Have each child pick two at random and place them on a chart for tens and ones as shown. The standard two-place numeral is written for the number represented on each domino piece or card and the sum is determined. Children may exchange domino pieces or cards.

| tens | ones |
|------|------|
|      |      |
|      |      |

$$\begin{array}{r} 46 \\ + 35 \\ \hline 81 \end{array}$$

This activity could become a game. The player whose sum is greatest (all the sums should be less than 99) wins the round.

### Calendar Addition (Activity for page 170)

Addition with or without regrouping may be practised using a calendar for any month of any year. Any two numbers chosen at random can become addends. A block of four numbers provides six possibilities for adding the numbers horizontally, vertically, and diagonally.

| SUN | MON | TUES | WED | THURS | FRI | SAT |
|-----|-----|------|-----|-------|-----|-----|
| 1   | 2   | 3    | 4   | 5     | 6   | 7   |
| 8   | 9   | 10   | 11  | 12    | 13  | 14  |
| 15  | 16  | 17   | 18  | 19    | 20  | 21  |
| 22  | 23  | 24   | 25  | 26    | 27  | 28  |
| 29  | 30  | 31   |     |       |     |     |

The block of four numbers indicated would provide the exercises

|      |      |
|------|------|
| 17   | 18   |
| + 24 | + 25 |
|      |      |
| 17   | 24   |
| + 18 | + 25 |

for vertical and horizontal choices. The diagonal choices are

|      |      |
|------|------|
| 17   | 18   |
| + 25 | + 25 |

Have the children note what is interesting about the sums of these two exercises (the sums are identical). Encourage the children to select other blocks of four numbers and test the numbers located diagonally for identical sums.



## Unit 9 Overview

In this unit the regrouping of 1 ten as 10 ones in subtraction is introduced. One lesson is included to show that in cases where a one-digit number is subtracted from a two-digit number, extensions of basic facts, rather than regrouping, may be used. Subtraction with regrouping of two-digit numbers with minuends to 99 is preceded by three lessons on renaming two-digit numbers, and two lessons in which ones are subtracted from tens and ones. The skills are applied in solving simple problems involving money and in comparing pairs of numbers. One lesson extends the skill of making change from 50 cents. The first lesson in the unit requires the children to construct a vertical bar graph and to make comparisons from the data given. The *kilogram* is introduced as a standard unit of measurement and masses of common objects are considered in relation to one kilogram. This unit includes the first two lessons on transformation (motion) geometry in Book 2 and children are asked to identify *slides* and *turns* of shapes. The topic of area is approached in an informal manner by having children count the squares covered by shapes or contained inside shapes. All the concepts and skills, with the exception of the kilogram, are assessed in the *Checkup* at the end of the unit.

### Unit Outcomes

#### Number

- make and interpret a vertical bar graph
- subtract one-digit and two-digit numbers, no regrouping, minuends to 99
- use the number line to complete patterns in subtraction, minuends to 99
- complete patterns in extensions of basic subtraction facts, minuends to 99
- regroup 1 ten as 10 ones
- subtract one-digit numbers from two-digit numbers, regrouping, minuends to 99
- subtract two-digit numbers, regrouping, minuends to 99
- use the standard form for subtracting two-digit numbers, regrouping, minuends to 99
- subtract amounts of money, regrouping, minuends to 99 cents
- add and subtract two-digit numbers, regrouping, sums and minuends to 99

#### Measurement

- compare the mass of an object with one kilogram
- estimate how many of a given object are equivalent to one kilogram; measure to check an estimate of mass
- make change from 50 cents by using the method of counting on
- count the units of area required to cover a surface
- count the square units contained by a shape

#### Geometry

- identify slides and turns

#### Background

**Number:** Since subtraction and addition are inverse operations, many of the concepts and skills that have been developed for addition in previous units are applicable to the work with subtraction in this unit. Patterns of basic facts may be used for

subtracting numbers in higher decades. Extensions may be useful in subtracting a one-digit number from a two-digit number. For example,  $76 - 4 = 72$  and  $86 - 4 = 82$  are extensions of  $6 - 4 = 2$ ;  $62 - 5 = 57$  and  $72 - 5 = 67$  are extensions of  $12 - 5 = 7$ . Extensions in subtraction, however, are not as important as in addition, especially in column addition where unseen addends are encountered. In subtraction it is possible to use regrouping and, although it is used in an inverse manner to that used in addition with regrouping, the same basic principle of renaming ten ones as one ten is involved in renaming one ten as ten ones.

Subtraction with regrouping is the major objective of this unit. In preparation for it, the children need practice in expressing numbers as tens and ones. The number twenty-four, which can be interpreted as 2 tens 4 ones, can also be considered as 1 ten 14 ones. It is important that the children have experiences with manipulating objects before encountering the abstract renaming of numbers, and procedures for doing so are outlined in the teaching suggestions. Subtraction involving amounts of money requires the same skills that are required for working with the standard algorithm for subtraction.

**Measurement:** The value of the change in a transaction can be determined by subtraction and some cash registers do make such a calculation. However, the counting of the change is done personally by the cashier. Making change involves a combination of counting on and addition. Basically, the procedure starts with the amount of the sale or purchase and change is added to this amount, beginning with the coins of least value. Cumulative sums are stated and as strategic amounts are reached, coins of greater values are used. These amounts are generally multiples of five or ten. For example, when 50¢ is used to pay for a purchase worth 32¢, three pennies are used to count on to 35¢, (33, 34, 35), then a nickel is used to reach 40¢, and finally a dime is used to reach 50¢.

The order used in making change illustrates another aspect of the relationship between addition and subtraction. Children have experienced showing one, two, or three more and also one, two, or three fewer than there are in a given set. The difference between numbers, in these situations, is the number of ones. Making change by counting on from the smaller number to the greater number illustrates, in a similar manner, that the difference between two numbers is the number of ones added to the smaller number to get the greater number.

It is a commonly accepted principle that prior experiences provide meaning for new terms and this is especially true in the field of measurement. The *kilogram* is introduced in this unit, and it is important that the children have opportunities to handle a variety of familiar objects that have masses of one kilogram in order to develop a meaningful concept of the term.

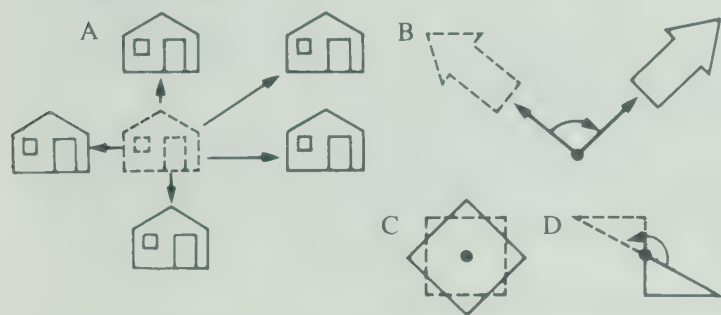
Children also need informal activities in covering surfaces with such things as tiles, cards, and pieces of paper to acquire a concept of area. The surfaces may be horizontal or vertical, such as the floor, the ceiling and walls of a room, or the faces of a box, as well as slanting, as on the board of a teeter-totter. The size of any surface can be stated in terms of how many smaller unit surfaces are required to cover it. The use of various shapes (circles, triangles, rectangles, squares) will enable the children to discover that some of these fit better than others. They will probably discover that rectangles and squares leave the least space uncovered and that of these two, squares are better than rectangles because turning them does not alter their fit. The

number of units of area is determined by counting or by adding the numbers of units in rows. The term *area* is not used at this stage nor is any formal method presented for determining the number of square units in a surface.

**Geometry:** Any given shape can be moved about on a surface to new positions where it will occupy exactly the same area. Its dimensions and shape remain the same; only its position is changed. Moves of geometric shapes in a plane are called *transformations*. The three simplest kinds are introduced: slides (translations), turns (rotations), and flips (reflections). The first two are described here; the third is described in the overview for Unit 10.

A *slide* can occur along any straight line from one position to another—to the right, to the left, up, down, or diagonally (A). The orientation of the shape undergoing a slide never changes.

A shape can be turned using any point as a *turn centre*. The turn centre may be outside the shape (B), inside the shape (C), or on the shape (D).



At this level only turn centres on the shape are considered, usually at a vertex. The easiest way to demonstrate this is by putting a pin through a shape and turning the shape about that point. There is no formal development of the terms *slide* and *turn*. They are used as verbs and consequently as motions the children can identify.

### Teaching Strategies

For subtraction with regrouping it is important to use the same models and charts for tens and ones that were used for regrouping in addition. In this way the children will be able to see the similarities between the two operations, although regrouping is used inversely. The Base Ten Blocks, Unifix cubes, or informal objects such as bundles of sticks or tickets can be used extensively in the early stages. At the same time, place-value pocket charts and abacus charts can be used to show and to record the steps in the procedure.

Although the children have reached a higher level of computation involving regrouping of sums and minuends, some will probably have a few lingering weaknesses in the basic facts and extra drill and practice, especially of the “teen” facts, is recommended. Attention to the methods of regrouping should not be hampered by concern for basic facts at this stage.

Children will benefit from informal experiences in handling kilogram masses and covering surfaces with square shapes before any formal lessons are presented on these topics. For these activities set out, several days in advance, materials and activity cards or charts and let the children work with them. Grouping is recommended for the lessons on the kilogram, covering surfaces, and slides and turns. The groups may be different from those for number topics, but small groups are desirable so that each child may have a chance to participate.

A toy store is recommended in connection with making change from 50 cents. Encourage the children to use the store in their spare time, as well as at scheduled times, and to take turns at being the storekeeper and practising the skill of counting on to make change. Frequent changes of items offered for “sale” in the play store will maintain interest in it.

### Materials

a work sheet of a grid with headings and scales for each child  
game boards as described on page T217, adapted for subtraction spinners made for page 127  
models for tens and ones  
demonstration number line, matching number strips for 1 to 9  
copies of pages T331 and T333 (optional)  
objects for grouping by tens, models for tens and ones, and an abacus chart for each child  
a long, narrow strip of paper for each child  
display board  
a chart for showing tens and ones, six sets of numeral cards for 0 to 9, one set of numeral cards for 10 to 18  
one or more masses of one kilogram, various objects for comparing masses  
kitchen scale that measures kilograms, balance scales  
containers having one kilogram of dry materials (rice, beans, flour, sugar, salt)  
the objects illustrated on page 183 or suitable substitutes  
oranges and other fruits and vegetables  
several of each of the objects illustrated on page 184 or suitable substitutes  
real money, play money, or coin cutouts from copies of page T327  
flash cards showing dimes and pennies (amounts to 99 cents)  
flash cards showing prices to 99¢  
pairs of cards showing equivalent amounts in dimes and pennies  
play store or store chart  
wooden or plastic three-dimensional models, an inclined surface  
attribute blocks, straight edge  
playing cards, acetate and overhead projector (optional)  
copies of the shapes from page T346  
cutouts of letters, numerals, and shapes  
pins, sheets showing pairs of shapes for a discussion of turns  
geometric paper shapes to use as non-standard units of area  
newspapers, books, envelopes, sheets of paper, playing cards, index cards, gummed square shapes, postage stamps, squared paper  
a geoboard and rubber bands of various colors for each child  
copies of page T341 or T342 for geopaper  
numeral cards for several two-digit numbers greater than 20 and a box  
cards expressing numbers as tens and ones  
pictures made from gummed square shapes  
special work sheets for slides and turns

### Vocabulary

|               |              |
|---------------|--------------|
| kilogram (kg) | turn         |
| slide up      | tile         |
| slide down    | overlap      |
| slide left    | surface      |
| slide right   | square units |
| fit           |              |



The purpose of this theme is to examine another facet of the environment, namely, plant life. It is hoped that the children will develop a further respect for living things and begin to appreciate our close relationship with nature.

Begin a plant-life display so that the children may see a variety of plants and be able to study their habits. Plant new seeds from time to time so that the children may continue to watch the growing process.

### LANGUAGE ACTIVITIES

#### 1. Discussing Plant Life

Read the following poem to the children.

##### UNDER THE COLD

It's nice to think  
That under snow,  
So cold to see,  
So cold to know,  
And under ice  
And frozen soil  
Are bluebell sprouts  
And small fern-coil  
And daisy-life.  
That in that place  
Are roots that will  
Be Queen Anne's Lace.  
Here, where we sled,  
Here, where we skate,  
I like to think  
They sleep and wait.

*Barbara A. Jones*

Discuss the poem and ask questions similar to the following:  
“What part of the plant continues to live season after season?”

“Why do snow and ice not harm these roots?”

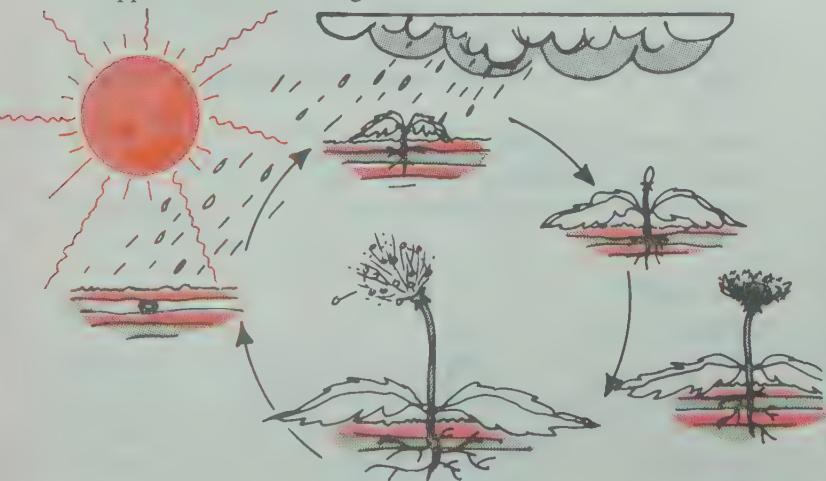
“What happens after the snow and the ice melt?”

“What plant life is mentioned in the poem?”

“What other plant life might you expect to find ‘under the cold’?”

#### 2. The Life Cycle of a Plant

Explain to the children that a cycle is a series of events that happens over and over again.



Explain that most plants begin from a seed. If the seed is kept moist, it will begin to sprout. The sprouted seed needs water and sunlight to grow into a mature plant. The mature plant will produce blooms and then seeds. As long as the seed is kept moist and allowed to sprout, the cycle will continue. The cycle is shown in the illustrations.

Discuss events that might interrupt the life cycle of a plant.

### 3. Writing Instructions

Demonstrate the correct method of planting a seed in a container. Explain why stones are provided for drainage and what kind of soil is being used. Large seeds may have to be soaked overnight to soften the tough outer coat.

To reinforce the skill of thinking logically, have the children print a set of instructions on how to plant a seed. These steps can be illustrated to further clarify the procedure.

### 4. Plant Names for People

In the past, parents often named baby girls after plants or flowers, for example, Rose, Violet, Daisy, Holly, Pansy, Lily, Iris, Ivy. Have the children determine whether any of their names belong to this special list of names.

In the centre of a sheet of chart paper, draw a large flower having many petals. As the children think of special names, print one name on each petal. Encourage the children to ask their parents for names that could be included.

### MATHEMATICS ACTIVITIES

#### 1. Plant Diaries

Use seeds such as bean, corn, pumpkin, marigold, nasturtium, hollyhock, or sunflower. Soak the seeds overnight in water to soften the coat and to hasten germination.

Have each child choose and plant a seed in a can, flower pot, or Styrofoam cup, making sure that there are holes for drainage. Keep the soil moist until the seeds sprout, then transfer the containers to a window sill and water the seedlings regularly.

Have each child keep a daily diary about her/his plant, noting the date and observations of its growth. In time, the plants will provide opportunities for measuring with a centimetre ruler and making comparisons.

Have the children use the information in the diaries to answer questions similar to the following:

“Which kind of seed sprouted first?”

“Which kind of seed sprouted last?”

“Which kind of seedling grew the fastest?”

“How long did it take for the plant to grow 5 cm?”

#### 2. Plants by Size

Because plants grow to different heights and in different proportions, these variations are taken into account when plants and shrubs are used to highlight a building. Ask the children to observe the shrubs and flowers used to enhance the school building. Have them use centimetre rulers and metre tapes to measure the plants. After the measurements have been obtained and recorded, make three charts labelled “Large Plants”, “Medium-sized Plants”, and “Small Plants”. Discuss with the children what criteria can be established for assigning each plant to its appropriate group. Using these criteria, complete the three charts.

### 3. Planning a Garden

Provide the children with a variety of seed and garden catalogues (available free from nursery garden centres). Ask each child to plan a simple vegetable garden or a flower box. Tell the children that they can have not more than five different kinds of vegetables or flowers in their gardens, and that they must not have more than 30 plants altogether.

Have the children copy the names of their choices in one column and the number they have chosen in another column. Ask them to check that the total is not more than 30.

After the children have completed their choices, have them make drawings of their gardens, showing the number of each kind of plant.

After the gardens have been completed, the children can make up problems for others to solve. For example, one child might say, "In my garden I have two rows of carrots. There are five carrots in each row. How many carrots are there in my garden?"

## SCIENCE ACTIVITIES

### 1. Classifying Plants

The study of plant life offers many possibilities for classification. Provide the children with resource books on plants and flowers. Display a chart for each classification and record the appropriate plants. Encourage the children to extend the charts whenever new information is obtained. At the end of this theme, the children will likely have collected considerable data for groups such as the following:

- garden flowers
- weeds and wild flowers
- vegetable plants
- house plants
- herbs
- desert plants
- mountain plants
- ocean plants

### 2. Propagating Plants

Many plants produce seeds and thus new plants. Some plants can be made to produce new plants in other ways. Demonstrate the following three methods of obtaining new plants.

#### *Stem Cuttings*

Cut a stem from *Coleus* or ivy with a clean, sharp knife. Fill a small, dark bottle with water. Cover the mouth with waxed paper or foil and punch a hole in this cover. Push the cutting through the opening and into the water. Add water from time to time to keep the bottle full.

Keep a record of the plant and observe the stem daily to see how long it takes for roots to form. When there is a substantial root growth, plant the stem and watch a new plant develop.

Geraniums can also be propagated from stem cuttings, but you will not be able to watch the roots form. Place the stem in a pot containing a mixture of half sand and half loam. Water this regularly and watch for new growth and, eventually, colorful blooms.

#### *Leaf Cuttings*

Some leaves will grow roots using the water method described above. Cut a leaf from an African violet and place it in water. When roots form, plant the cutting in rich, light soil. Keep the soil moist until a new plant appears, and then allow the soil to dry out slightly before any further watering.

### *Division of Root Growth*

When some plants get too large, they can be divided into new plants and repotted. This can be demonstrated with *Sansevieria* (snake plant) or chives. Carefully remove the plant from the soil and gently separate it into two or three parts. Place each new plant in a container and water generously. Watch for new growth.

### 3. Kinds of Soil

In order to obtain a strong and healthy plant, it is necessary to choose suitable soil for the plant. Obtain samples of clay, loam, and sand. Have the children feel each kind of soil and describe its texture. Use the three kinds of soil for the following experiment.

Obtain three cans of the same size, and label them C, L, and S. Punch a hole in the bottom of each can and place the same amount of soil in each of the cans; that is, clay in C, loam in L, and sand in S.

Fill a litre container with water. Slowly pour the water into can C. Determine how long it takes before the water drips from the hole into another container. After the dripping has stopped, pour the water back into the litre container. Calculate how much water is retained in the soil. Repeat the procedure for cans L and S. Have the children decide which kind of soil retains moisture best.

### 4. How Plants Get Food

Perform this simple experiment to demonstrate to the children how water and plant nutrients are carried upward to the leaves of a plant.

Pour water into two identical glass jars until each is about half full. Add red dye or a few drops of red food coloring to the water in one of the jars and stir well. Select a large stalk of celery with leaves intact. Using a sharp knife, slice the stalk in half vertically, being careful to have some leaves on each half. Place one piece of the stalk in each jar. Set the jars in a safe place for observation by the children twenty-four hours later.

The next day the children will observe that, unlike the piece of celery in the clear water, the piece of celery in the colored water is pink. Explain to the children that the pink coloring in the stalk indicates that water and plant food travel from the roots up the stems to the leaves of a plant.

You may also wish to place a leaf in colored water and leave it overnight. The next day the children will be able to observe the network of veins through which food is carried to every part of the leaf.

### 5. A Mould Garden

Many children are probably familiar with the mould that grows on bread, cheese, or jam. To grow some mould for the children to examine under a microscope or with a magnifying glass, place two wet paper towels in a wide-mouthed glass jar. Place a piece of bread on top of the paper towels. Moisten the bread slightly and leave it exposed to the air for about an hour. Then cover the jar and place it in a dark cupboard in the classroom. Let the children view the jar each day to see how much growth has taken place.

At the end of one week remove the growth from the jar and let the children examine the fine white threads of the mould. Can they see little black balls at the ends of some of the threads?

Discuss where the mould gets its food. You may also wish to discuss the fact that even though moulds are not very pretty plants, they are useful to us: they cause the decay of dead plants



and animals, and thus restore substances to the soil for other plants to use.

## SOCIAL STUDIES ACTIVITIES

### 1. Plant Origins

Many plants that we see in homes, schools, and offices are natives of special environments. In these environments, they grow wild and depend on the elements of nature to thrive and propagate. In our indoor environments, we must provide some of these elements to keep the plants healthy.

Discuss the characteristics and requirements of some of these special plants with the children.

*Tropical Plants* (orchids, palms, African violets, some ferns)

- They live in rich, damp soil.
- Because jungle growth is so thick, they often require very little direct sunlight.
- Because they come from warm and humid environments, they need temperatures of about 20°C and frequent misting on the leaves.

*Desert Plants* (succulent plants such as cactuses)

- They live in dry, sandy soil.
- Because they come from hot, dry regions, they require little water.
- They can withstand direct sunlight and high temperatures during the day, but they should be kept cool at night.
- Cactuses are often covered with sharp spines or thorns.
- Cactuses often have spectacular blooms.

## ART ACTIVITIES

### 1. Plant Containers

Many useful and colorful plant containers can be made from household discards. Try several of these for color and interest in the classroom.

*Rope Wrap*

Choose a clean can and punch holes in the bottom for drainage. Spread white glue around the outside of the can and wrap a lightweight cord or bulky yarn tightly and closely around the can, starting at the bottom. Loops and coils can be made and the spaces filled in with bits of yarn of different colors. Work slowly up the can until it is completely wrapped. When the glue is dry, a coat of shellac will protect the covering.

*Roll Wrap*

Choose a can with straight sides and punch holes in the bottom for drainage. Draw an isosceles triangle having a base equal to the height of the can. Using this triangle as a pattern, cut triangles from brightly colored pictures in magazines. Roll a triangle around a pencil, starting at the base and having the colored side facing outward. Fasten the end with glue. Glue these rolls vertically to the outside of the can. When the glue is dry, apply a protective coat of shellac.

### 2. Dried Flower Bookmarks

Collect wild flowers or garden flowers small enough to fit on a rectangle having dimensions of 20 cm and 5 cm. Some children may be able to bring flowers from home. Identify each flower and discuss its characteristics.

Arrange each flower carefully inside a folded piece of paper and place it under a heavy book. While the flowers are drying (about four or five days), obtain some clear vinyl with an adhesive

backing and pieces of brightly colored yarn, cord, or narrow ribbon.

For each bookmark you will need one piece of vinyl neatly cut to measure 20 cm by 5 cm and another piece slightly larger for a backing. Peel the protective layer off the first piece of vinyl and place one or more of the pressed flowers on the adhesive side of the vinyl. Peel the protective layer off the second piece of vinyl and place this one over the flowers. Press the edges of the two vinyl pieces firmly together. Trim the excess from around the edges and round off the corners.

Use a paper punch to make a hole at the top of the bookmark. Thread a piece of yarn or ribbon through the hole and knot or trim each end to give a neat appearance. The children can use these bookmarks in their readers or in a favorite storybook.

### 3. Leaf Rubbings

Collect as many different kinds of leaves as possible. Demonstrate how to make a leaf rubbing. To do this, place a leaf with its underside up on a hard, smooth surface, such as glass or plastic to avoid streaks in the rubbing. Cover the leaf with a piece of white shelf paper or thin typing paper. Hold the leaf firmly in place with one hand pressing on it through the paper. In the other hand, hold a black or brown crayon on its side and use short strokes as you move the crayon firmly across the paper. Press hard enough so that the edges, ribs, and veins are darker than the rest of the leaf.

If a rubbing is a bit messy around the edges, cut away the background and mount the rubbing on a clean sheet of paper.

Let the children practise rubbing some of the leaves. When the children become experienced at rubbing, they will enjoy seeing how many different kinds of leaves they can find to rub. They can rub the leaves of trees, shrubs, flowering plants, vegetables, ferns, wild flowers, weeds, and grasses. Since this is an excellent activity to develop the ability to perceive likenesses and differences, perhaps the most useful rubbings would be those of the leaves of trees. You may wish to have the children write facts about each leaf; for example, what kind it is, characteristics of it, and where they found it.

## MOVEMENT ACTIVITIES

### 1. Pretend a Tree

Discuss with the children how different trees move when the wind is blowing. Have them describe the sounds made by the wind in the trees. Have the children choose different trees and demonstrate how the trees move in a gentle breeze, in a strong north wind, in a thunderstorm, and in a hurricane.

## MUSIC ACTIVITIES

### 1. Plants in Song

Have the children collect the titles of songs that make reference to plant life. Add to the list as children discover new titles. Use the following songs to start the collection.

“The Holly and the Ivy”

“The Bluebells of Scotland”

“Cherry Blossom”

“Yellow Rose of Texas”

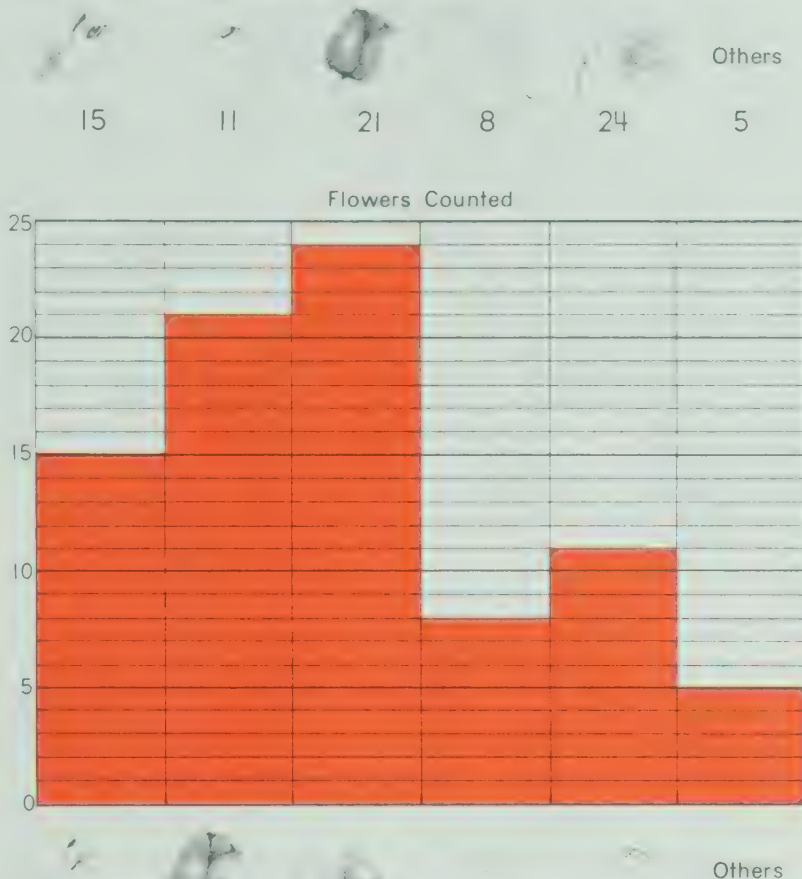
“Edelweiss”

“Where Have All the Flowers Gone”

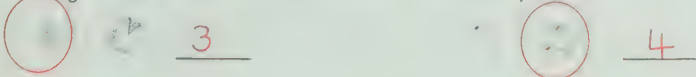
If possible, obtain recordings of some of the songs and play them for the children’s enjoyment.

## Unit 9

Some children counted spring flowers.  
Show how many of each on the graph.



Ring which there were more of. How many more?



Make up other problems to solve.

Making and interpreting a vertical bar graph

(one hundred seventy-one) 171

## LESSON OUTCOME

Make and interpret a vertical bar graph

## Materials

work sheet of a grid with headings and scales for each child

## Vocabulary

crocus, snowdrop, tulip, lily of the valley, daffodil

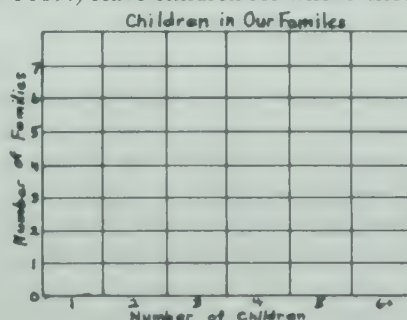
## RELATED ACTIVITIES

- You may wish to have five or six groups of children develop different graphs and write questions related to each graph. These can be displayed and used as learning situations. Children can go from graph to graph, read the questions, and write the answers on their papers.

## LESSON ACTIVITY

## Before Using the Page

Ask several children how many children there are in their families. Remind them to count themselves as one of the children in the family. To collect the information for graphing the number of children in each family, prepare a tally chart on the chalkboard. (See page T169.) Have children for whom there is one child in the family place tallies in the appropriate column of the chart. Have other children, in turn, place tallies so that the columns are completed in order. Have children count the tallies in each column.



Prepare a work sheet having a grid with headings and scales similar to those shown. Give one copy to each child. Have

children use the numbers in the tally chart for coloring squares in each column of the graph. When the graph has been completed, ask questions similar to these:

“How many families have \_\_\_\_\_ children?”

“Are there more families with \_\_\_\_\_ children or with \_\_\_\_\_ children? How many more?”

“Do fewer families have \_\_\_\_\_ children or \_\_\_\_\_ children? How many fewer?”

You may prefer to have the children help prepare one large graph for the whole class, rather than individual graphs. Prepare the headings for a large sheet of squared paper. You will not need a tally chart. Ask the children who have no brothers or sisters to form one group, and have each child color one square in the appropriate column. Then ask the remaining groups of children, in turn, to color squares so that the columns are completed in order.

## Using the Page

- See whether the children can identify the flowers pictured. Ask what is meant by “Others”. Discuss how the children are to complete the graph. Then let them work independently.



## OBJECTIVE

Subtract one-digit and two-digit numbers, no regrouping, minuends to 99

### Materials

work sheets (optional), game boards as described on page T217 and adapted for subtraction, spinners made for page 127, models for tens and ones

## RELATED ACTIVITIES

- Encourage the children to master the basic addition and subtraction facts having sums and minuends to 18. Addition facts for sums of 11 to 18 can be organized by sums. Subtraction facts can be organized by their minuends.

| 11    | 12    | 13    | 14  |
|-------|-------|-------|-----|
| 9 + 2 | 9 + 3 | 9 + 4 | 9 + |
| 8 + 3 | 8 + 4 | 8 + 5 |     |
| 7 + 4 | 7 + 5 |       |     |

| 11     | 12     | 13     | 14     |
|--------|--------|--------|--------|
| 11 - 2 | 12 - 3 | 13 - 4 | 14 - 5 |
| 11 - 3 | 12 - 4 | 13 - 5 | 14 - 6 |
| 11 - 4 |        |        |        |

Complete.

| —  | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----|---|---|---|---|---|---|---|---|---|---|
| 9  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |   |
| 11 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |   |   |
| 12 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |   |   |   |
| 13 | 4 | 5 | 6 | 7 | 8 | 9 |   |   |   |   |
| 14 | 5 | 6 | 7 | 8 | 9 |   |   |   |   |   |
| 15 | 6 | 7 | 8 | 9 |   |   |   |   |   |   |
| 16 | 7 | 8 | 9 |   |   |   |   |   |   |   |
| 17 | 8 | 9 |   |   |   |   |   |   |   |   |
| 18 | 9 |   |   |   |   |   |   |   |   |   |

Subtract.

$$\begin{array}{r} 43 \\ - 20 \\ \hline 23 \end{array}$$

$$\begin{array}{r} 60 \\ - 50 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 18 \\ - 12 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 35 \\ - 13 \\ \hline 22 \end{array}$$

$$\begin{array}{r} 49 \\ - 17 \\ \hline 32 \end{array}$$

$$\begin{array}{r} 67 \\ - 45 \\ \hline 22 \end{array}$$

$$\begin{array}{r} 85 \\ - 42 \\ \hline 43 \end{array}$$

$$\begin{array}{r} 43 \\ - 43 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 36 \\ - 22 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 76 \\ - 23 \\ \hline 53 \end{array}$$

$$\begin{array}{r} 72 \\ - 62 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 59 \\ - 13 \\ \hline 46 \end{array}$$

$$\begin{array}{r} 78 \\ - 45 \\ \hline 33 \end{array}$$

$$\begin{array}{r} 68 \\ - 6 \\ \hline 62 \end{array}$$

$$\begin{array}{r} 67 \\ - 63 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 95 \\ - 64 \\ \hline 31 \end{array}$$

$$\begin{array}{r} 89 \\ - 32 \\ \hline 57 \end{array}$$

$$\begin{array}{r} 59 \\ - 55 \\ \hline 4 \end{array}$$

172 (one hundred seventy-two)

Subtraction practice: minuends to 99

## LESSON ACTIVITY

### Before Using the Page

- Review subtraction facts having minuends to 18. Number wheels and similar devices may be used on the chalkboard or on work sheets prepared in advance.



| —  | 8 |
|----|---|
| 12 | 4 |
| 9  |   |
| 10 |   |

| —  | 9 | 4 | 6 | 10 |
|----|---|---|---|----|
| 14 | 5 |   |   |    |

- Adapt the game "Teen Numbers" described on page T217, for subtraction. Four sentences for subtraction may be shown on the back of each game board. The cards for 11 to 19 take the positions for the minuends for these sentences.

|  |
|--|
| <input type="checkbox"/> - <input type="checkbox"/> = 10 |
| <input type="checkbox"/> - <input type="checkbox"/> = 10 |
| <input type="checkbox"/> - <input type="checkbox"/> = 10 |
| <input type="checkbox"/> - <input type="checkbox"/> = 10 |

- Use models of tens and ones to review the procedure for subtracting two-digit numbers where no regrouping is involved. Write  $38 - 23$  in vertical form on the chalkboard. Ask a child to represent 38 using tens and ones. Ask another child to remove the appropriate number of ones and then tens for 23. Ask a third child to complete the subtraction exercise on the chalkboard. Use other examples as required.

### Using the Page

- For the first part of the page, have the children use the spinner they made for page 127. Demonstrate how a number of their choice is selected from the first column as a minuend. Then the number to be subtracted is obtained by using the spinner, and the answer is written in the appropriate square. When the children understand the procedure, they may begin the page. You may have them work independently and complete all of the chart or only some of the exercises determined by a time limit.
- The second part of the page provides practice in subtraction without regrouping. Remind the children that for exercises such as  $43 - 43$ , only one zero need be written for the difference.

Complete. Use the number line to help.



$$33 - 1 = \underline{32}$$

$$33 - 2 = \underline{31}$$

$$33 - 3 = \underline{30}$$

$$33 - 4 = \underline{29}$$

$$33 - 5 = \underline{28}$$

$$36 - 5 = \underline{31}$$

$$36 - 6 = \underline{30}$$

$$36 - 7 = \underline{29}$$

$$36 - 8 = \underline{28}$$

$$36 - 9 = \underline{27}$$



$$55 - 3 = \underline{52}$$

$$55 - 4 = \underline{51}$$

$$55 - 5 = \underline{50}$$

$$55 - 6 = \underline{49}$$

$$55 - 7 = \underline{48}$$

$$61 - 1 = \underline{60}$$

$$61 - 2 = \underline{59}$$

$$61 - 3 = \underline{58}$$

$$61 - 4 = \underline{57}$$

$$61 - 5 = \underline{56}$$

$$74 - 2 = \underline{72}$$

$$74 - 3 = \underline{71}$$

$$74 - 4 = \underline{70}$$

$$74 - 5 = \underline{69}$$

$$74 - 6 = \underline{68}$$

$$87 - 4 = \underline{83}$$

$$87 - 5 = \underline{82}$$

$$87 - 6 = \underline{81}$$

$$87 - 7 = \underline{80}$$

$$87 - 8 = \underline{79}$$

Patterns in subtraction on the number line

(one hundred seventy-three) 173

## LESSON OUTCOME

Use the number line to complete patterns in subtraction, minuends to 99

### Materials

demonstration number line, number lines from copies of page T331 (optional)

## RELATED ACTIVITIES

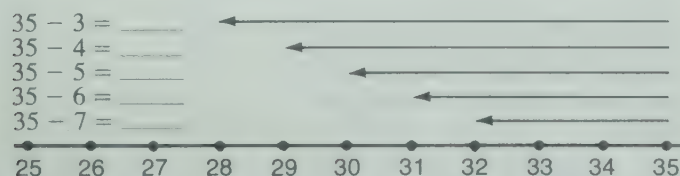
- Provide each child with a copy of page T333 and have her/him illustrate subtraction exercises by coloring squares. For example, to illustrate  $35 - 6$ , the child would begin at 35, count back six squares (34, 33, 32, 31, 30, 29), color five squares, and then ring the numeral in the sixth square (29).

## LESSON ACTIVITY

### Before Using the Page

- Use the number line to obtain differences in a pattern to prepare the children for the concept of subtraction with regrouping. Have the children observe the change in the digits as the difference approaches, reaches, and then passes the multiple of ten.

Select part of the number line, for example, the interval from 25 to 35.



Write the five subtraction sentences on the chalkboard. Begin at 35, draw an arrow to illustrate each subtraction sentence, and have children complete the corresponding sentence on the chalkboard. When all the answers are shown, discuss at which

point a change occurs in the tens' digit of the differences, and what happens to the ones' digit at that point.

Repeat the procedure for the same interval of the number line and illustrate these five sequential differences:  $33 - 2$ ,  $33 - 3$ ,  $33 - 4$ ,  $33 - 5$ ,  $33 - 6$ . Working on the same part of the number line for several sequences may enable children to predict when the tens' digit will change, and to see that the ones' digit becomes 9 when this change occurs.

- Repeat the preceding activity for a different interval of the number line, for example, from 75 to 85.

### Using the Page

- The page continues the procedure suggested in *Before Using the Page*, except that the children do not need to draw the arrows on the number line. If you feel that some children need to show the arrows, provide them with number lines.
- After the children have completed the page, discuss the six patterns. The children may explain the change in their own words or you may ask questions: "When did the digit in the tens' place change? What digit is in the ones' place then? What digit is in the ones' place before this change?"



## LESSON OUTCOME

Complete patterns in extensions of basic subtraction facts, minuends to 99

## Materials

demonstration number line, matching number strips for 1 to 9, number lines from copies of page T331 (optional), number charts from copies of page T333 (optional)

## RELATED ACTIVITIES

- You may wish to discuss the patterns for differences on the page in a manner similar to that suggested for the activities in *Before Using the Page*.
- The children may extend the patterns on the page to complete the sequences for minuends to 99. Ask the children to rearrange the exercises for the last two patterns so that the differences will be in sequence.

Complete the patterns.

$$6 - 4 = \underline{2}$$

$$12 - 6 = \underline{6}$$

$$14 - 9 = \underline{5}$$

$$16 - 4 = \underline{12}$$

$$22 - 6 = \underline{16}$$

$$24 - 9 = \underline{15}$$

$$26 - 4 = \underline{22}$$

$$32 - 6 = \underline{26}$$

$$34 - 9 = \underline{25}$$

$$36 - 4 = \underline{32}$$

$$42 - 6 = \underline{36}$$

$$44 - 9 = \underline{35}$$

$$46 - 4 = \underline{42}$$

$$52 - 6 = \underline{46}$$

$$54 - 9 = \underline{45}$$

$$13 - 8 = \underline{5}$$

$$15 - 8 = \underline{7}$$

$$18 - 9 = \underline{9}$$

$$23 - 8 = \underline{15}$$

$$25 - 8 = \underline{17}$$

$$28 - 9 = \underline{19}$$

$$33 - 8 = \underline{25}$$

$$35 - 8 = \underline{27}$$

$$38 - 9 = \underline{29}$$

$$43 - 8 = \underline{35}$$

$$45 - 8 = \underline{37}$$

$$48 - 9 = \underline{39}$$

$$53 - 8 = \underline{45}$$

$$55 - 8 = \underline{47}$$

$$58 - 9 = \underline{49}$$



|  |   |   |   |   |   |
|--|---|---|---|---|---|
| $\begin{array}{r} 15 \\ - 9 \\ \hline 6 \end{array}$ | $\begin{array}{r} 25 \\ - 9 \\ \hline 16 \end{array}$ | $\begin{array}{r} 35 \\ - 9 \\ \hline 26 \end{array}$ | $\begin{array}{r} 45 \\ - 9 \\ \hline 36 \end{array}$ | $\begin{array}{r} 55 \\ - 9 \\ \hline 46 \end{array}$ | $\begin{array}{r} 65 \\ - 9 \\ \hline 56 \end{array}$ |
|--|---|---|---|---|---|

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| $\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$ | $\begin{array}{r} 31 \\ - 3 \\ \hline 28 \end{array}$ | $\begin{array}{r} 41 \\ - 3 \\ \hline 38 \end{array}$ | $\begin{array}{r} 61 \\ - 3 \\ \hline 58 \end{array}$ | $\begin{array}{r} 81 \\ - 3 \\ \hline 78 \end{array}$ | $\begin{array}{r} 51 \\ - 3 \\ \hline 48 \end{array}$ |
|--|---|---|---|---|---|

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| $\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$ | $\begin{array}{r} 27 \\ - 9 \\ \hline 18 \end{array}$ | $\begin{array}{r} 57 \\ - 9 \\ \hline 48 \end{array}$ | $\begin{array}{r} 37 \\ - 9 \\ \hline 28 \end{array}$ | $\begin{array}{r} 77 \\ - 9 \\ \hline 68 \end{array}$ | $\begin{array}{r} 97 \\ - 9 \\ \hline 88 \end{array}$ |
|--|---|---|---|---|---|

174 (one hundred seventy-four)

Patterns in subtraction, minuends to 99

## LESSON ACTIVITY

## Before Using the Page

- To continue the exploration of patterns in subtraction (extensions of the basic facts), write four subtraction sentences having the pattern  $7 - 4 = \underline{\quad}$ ,  $17 - 4 = \underline{\quad}$ ,  $27 - 4 = \underline{\quad}$ ,  $37 - 4 = \underline{\quad}$  on the chalkboard. Ask the children to state the differences by applying the basic fact  $7 - 4 = 3$ . Review how to use the number line with a matching four-strip to illustrate subtraction, as on page T174. Have children help to use the number strip and write the results on the chalkboard. Then have the children extend the pattern to include  $97 - 4 = \underline{\quad}$  and write the differences without using the number line.
- Use the procedure of the previous activity and have children demonstrate how to find the differences in the following sequence:  $13 - 5 = \underline{\quad}$ ,  $23 - 5 = \underline{\quad}$ ,  $33 - 5 = \underline{\quad}$ ,  $43 - 5 = \underline{\quad}$ ,  $53 - 5 = \underline{\quad}$ . Have the children write the differences and extend the given pattern to include the sentence  $93 - 5 = \underline{\quad}$ .

Repeat the above procedure for a sequence that starts, for example, with  $32 - 6 = \underline{\quad}$  and stops at  $62 - 6 = \underline{\quad}$ .

Then have the children extend the sequence at both ends to complete the pattern from  $12 - 6 = \underline{\quad}$  to  $92 - 6 = \underline{\quad}$ .

- Direct the children's attention to the tens' digit of the minuend and the tens' digit of the difference in each subtraction sentence for the preceding sequences. The number line may be used to show the move into the next decade in each case.

- Provide oral drill involving sequences of subtraction sentences based on the same basic fact, to give children practice in using the patterns.

$$\begin{array}{r} 13 - 5 = 8 \\ 23 - 5 = 18 \\ 33 - 5 = 28 \\ 43 - 5 = 38 \end{array}$$

$$\begin{array}{r} 12 - 7 = \underline{\quad} \\ 22 - 7 = \underline{\quad} \\ \cdot \\ \cdot \\ \cdot \end{array}$$

## Using the Page

- The page continues the procedure suggested in *Before Using the Page*. Have the children complete the patterns. Provide copies of page T331 or T333 for children who may need to refer to the number line or the number chart.

Regroup one ten to show ten ones.



3 tens 0 ones

2 tens 10 ones

20      2 tens    0 ones  
\_\_\_\_\_ ten    10 ones

50      5 tens    0 ones  
\_\_\_\_\_ 4 tens    10 ones

60      6 tens    0 ones  
\_\_\_\_\_ 5 tens    10 ones

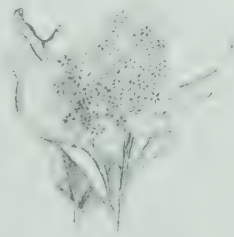
80      8 tens    0 ones  
\_\_\_\_\_ 7 tens    10 ones

30      3 tens    0 ones  
\_\_\_\_\_ 2 tens    10 ones

40      4 tens    0 ones  
\_\_\_\_\_ 3 tens    10 ones

70      7 tens    0 ones  
\_\_\_\_\_ 6 tens    10 ones

90      9 tens    0 ones  
\_\_\_\_\_ 8 tens    10 ones



Regrouping 1 ten as 10 ones

(one hundred seventy-five) 175

## LESSON OUTCOME

Regroup 1 ten as 10 ones for multiples of ten to 90

### Materials

objects for grouping by tens, models for 9 tens and 10 ones and an abacus chart for each child

## RELATED ACTIVITIES

- Have the children work in pairs using 9 tens and 10 ones and an abacus chart. One child chooses a multiple of ten to 90, say, sixty, writes the standard numeral (60), shows the appropriate number of tens on the abacus chart, and then writes the number of tens and ones (6 tens 0 ones). The partner checks these, takes one ten and regroupes it as ten ones, and writes the new number of tens and ones (5 tens 10 ones). Then the children change roles.

## LESSON ACTIVITY

### Before Using the Page

- Have the children rote count by tens from 10 to 90. Then have them count by tens saying, "One ten - ten, two tens - twenty" and so on, as you display from one ten to nine tens in turn.
- Have the children work in pairs using objects for grouping by tens and the abacus charts suggested on page T90. Ask one child in each pair to place 2 tens and 0 ones on her/his chart. Ask the other child in each pair to place 1 ten and 10 ones on her/his chart. Ask whether 2 tens 0 ones and 1 ten 10 ones name the same number or different numbers. Develop that they name the same number because the 10 ones can be regrouped as 1 ten, which can then be placed with the other ten to give 2 tens 0 ones. Ask the children to suggest another way of showing that 1 ten 10 ones and 2 tens 0 ones are names for the same number. Lead them to suggest taking 1 ten of the 2 tens, regrouping it as 10 ones, and showing the 10 ones in the ones' place. Write "2 tens 0 ones = 1 ten 10 ones" on the chalkboard. Repeat the procedure for other multiples of ten to 90.

- Write the numeral 40 on the chalkboard. Ask how many tens and ones this is and have a child display 4 tens and 0 ones. Ask for another way to represent forty using 1 fewer ten. Have a child demonstrate and explain the method. Write the following on the chalkboard and ask children to complete it.

40      4 tens 0 ones = \_\_\_\_\_ tens \_\_\_\_\_ ones

Use other examples for multiples of ten. Emphasize in each example that only 1 ten is regrouped to give 10 more ones.

### Using the Page

- Read the instruction with the children. For the first exercise, ask how many tens and ones there are in the first row. Have the children trace over the dotted 3 and the dotted 0. Ask what number this is (thirty). Ask how many tens and ones there are in the second row. Have the children trace over the dotted 2 and the dotted 10. Ask what number this is and have a child explain why 2 tens 10 ones also represents thirty. (One of the tens has been regrouped as 10 ones.)

Ask the children to complete the next exercise. Discuss their results with them. Then let them work independently. Some children may need to use models of tens and ones.



# LESSON OUTCOME

Regroup 1 ten as 10 ones

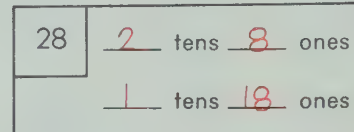
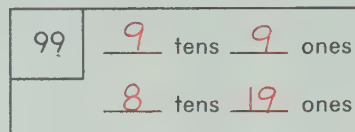
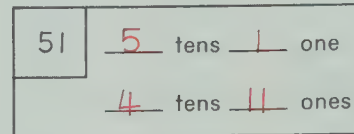
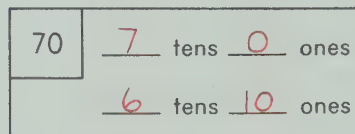
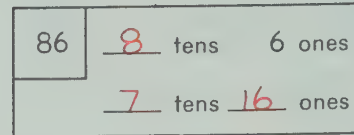
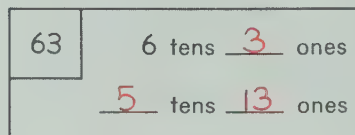
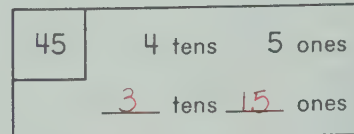
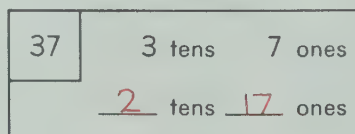
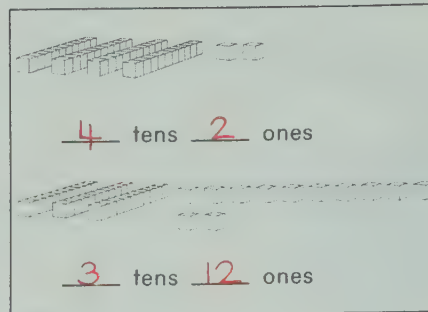
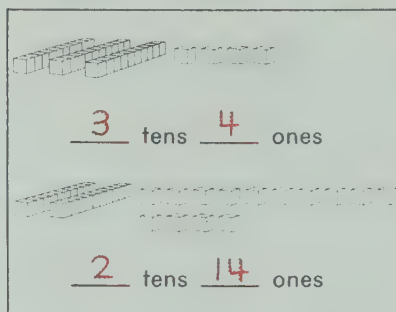
## Materials

objects for grouping by tens,  
models for 9 tens and 19 ones and  
an abacus chart for each child

## RELATED ACTIVITIES

- Children may work in pairs using 9 tens and 19 ones and an abacus chart. One child chooses a two-digit number, say, forty-two, writes the standard numeral (42), shows the appropriate number of tens and ones on the abacus chart, and then writes the number of tens and ones (4 tens 2 ones). The partner checks these, takes one ten and regroups it as ten ones, and writes the new number of tens and ones (3 tens 12 ones). Then the children change roles.

Regroup one ten to show ten more ones.



176 (one hundred seventy-six)

Regrouping 1 ten as 10 ones

## LESSON ACTIVITY

### Before Using the Page

- Have the children work in pairs. Each child will need objects for grouping by tens and an abacus chart. Ask one child in each pair to place 2 tens and 4 ones on her/his chart. Ask the other child in each pair to place 1 ten and 14 ones on her/his chart. Ask whether 2 tens 4 ones and 1 ten 14 ones name the same number or different numbers. Have children explain their answer. Lead them to suggest that the 14 ones can be regrouped to give 1 ten and 4 ones and the extra ten can be placed with the other ten to give 2 tens and 4 ones.

Ask the children to suggest another way of showing that both are names for the same number. Lead them to suggest taking one ten and renaming it as ten ones, and showing them with the other ones. Write "2 tens 4 ones = 1 ten 14 ones" on the chalkboard. Emphasize that both are names for the same number. Have a child state the number represented and write the standard numeral on the chalkboard. Repeat for other examples.

- Have each child display models of 5 tens and 4 ones. Write "5 tens 4 ones = \_\_\_\_ tens \_\_\_\_ ones" on the chalkboard.

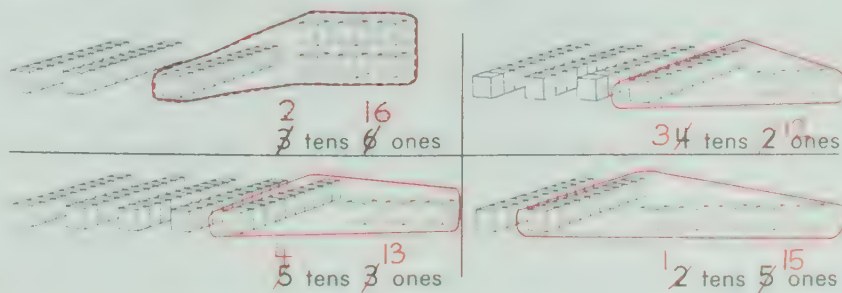
Ask the children to take one ten and exchange it for ten ones, and place them with the ones. Ask how many tens and ones there are. Have a child complete the sentence on the chalkboard.

- Have the children work in pairs, using models of tens and ones. Write the numeral 23 on the chalkboard. Ask how many tens and ones this is. Ask one child in each pair to display 2 tens and 3 ones. Ask the children to think of a way to give their partners 5 ones from the 2 tens and 3 ones. Have a child explain that this can be done by regrouping one ten as 10 ones and then giving the partner 5 ones. Ask the children how many tens and ones they have left when they have finished the regrouping and given away 5 ones.

### Using the Page

- Read the instruction with the children. For the first exercise, ask how many tens and ones there are in the first row. Ask how many tens and ones there are in the second row. Ask why 2 tens 14 ones names the same number as 3 tens 4 ones. Ask what the number is. Then let the children work independently. Some children may need to use models of tens and ones.

Regroup one ten to show ten more ones.



5 tens 2 ones

8 tens 4 ones

4 tens 9 ones

6 tens 0 ones

7 tens 6 ones

0 tens 13 ones

4 tens 7 ones

3 tens 11 ones

5 tens 0 ones

Match.

|               |                |
|---------------|----------------|
| 4 tens 5 ones | 1 ten 18 ones  |
| 6 tens 3 ones | 3 tens 15 ones |
| 2 tens 8 ones | 8 tens 10 ones |
| 7 tens 1 one  | 5 tens 13 ones |
| 9 tens 0 ones | 6 tens 11 ones |

Regrouping 1 ten as 10 ones

(one hundred seventy-seven) 177

## LESSON OUTCOME

Regroup 1 ten as 10 ones

### Materials

models for 9 tens and 19 ones for each child

## RELATED ACTIVITIES

- Prepare work sheets or work cards showing pictures of tens and ones. Have the children write the number of tens and ones shown, regroup one ten and associate the ten ones with the other ones by drawing a loop around them, and then write the new number of tens and ones. You may also wish to have the children write the standard numeral.

## LESSON ACTIVITY

### Before Using the Page

- Display models of 3 tens and 4 ones. Write

"\_\_\_\_\_ tens \_\_\_\_\_ ones = \_\_\_\_\_ tens \_\_\_\_\_ ones"

on the chalkboard. Have a child count the tens and the ones and write the numerals in the first two blanks. Ask a child to regroup one ten to form ten more ones. Have the child count the tens and the ones and write the numerals in the last two blanks. Have a child read the statement. Emphasize that the sentence shows two names for the same number. Repeat the procedure.

- Refer to the examples written on the chalkboard from the previous activity. Write 3 tens 4 ones again. Ask the children how many tens will be left if you rename one ten as ten ones. Cross out the 3 and write 2 above it. Explain that this is a short way to show the renaming of one ten as ten ones. Next ask how many ones there are in all. Cross out the 4 and write 14 above it. Ask if 2 tens 14 ones names the same number as 3 tens 4 ones.

2 tens 14 ones

Write tens and ones for several numbers on the chalkboard. Have the children copy them and use the short way to show the renaming of one ten as ten ones.

### Using the Page

- Read the instruction with the children. For the first exercise, ask what number is represented, what the dotted loop shows, and what another name for the number is. Have the children trace over the dotted numerals. Then have the children draw a loop to show ten more ones for each of the other three illustrated exercises, and write the corresponding name for the number.

For the nine exercises in the middle of the page, the children are to regroup one ten to show ten more ones without referring to models of tens and ones.

For the last part of the page, have the children draw a line from "4 tens 5 ones" to its other name in the second column. Then let the children work independently.



## LESSON OUTCOME

Subtract one-digit numbers from two-digit numbers, regrouping, minuends to 99

### Materials

objects for grouping by tens, models for 9 tens and 18 ones for each child


## RELATED ACTIVITIES

- Children may review basic subtraction facts having minuends to 18 by playing the game "Checkout" described on page T247.

I have

I will take away

How many will be left?



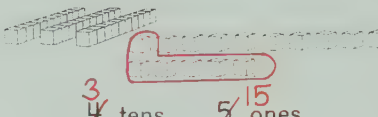
$$\begin{array}{r} 2 \text{ tens } 12 \text{ ones} \\ - \quad \quad 7 \text{ ones} \\ \hline 2 \text{ tens } 7 \text{ ones} \quad 27 \end{array}$$

Regroup and complete.

4 tens 5 ones

Take away 6 ones.

How many are left?

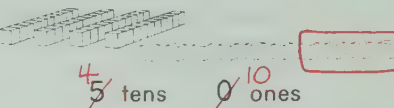


$$\begin{array}{r} 4 \text{ tens } 5 \text{ ones} \\ - \quad \quad 6 \text{ ones} \\ \hline 3 \text{ tens } 9 \text{ ones} \quad 39 \end{array}$$

5 tens 0 ones

Take away 4 ones.

How many are left?

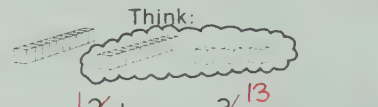


$$\begin{array}{r} 5 \text{ tens } 0 \text{ ones} \\ - \quad \quad 4 \text{ ones} \\ \hline 4 \text{ tens } 6 \text{ ones} \quad 46 \end{array}$$

2 tens 3 ones

Take away 8 ones.

How many are left?



Think:

$$\begin{array}{r} 2 \text{ tens } 3 \text{ ones} \\ - \quad \quad 8 \text{ ones} \\ \hline 1 \text{ ten } 5 \text{ ones} \quad 15 \end{array}$$

178 (one hundred seventy-eight)

Subtracting one-digit numbers from two-digit numbers, regrouping

## LESSON ACTIVITY

### Before Using the Page

- Write on the chalkboard the three lines shown. Have a child write the numeral 32 on another part of the chalkboard.

|                       |                       |
|-----------------------|-----------------------|
| _____ tens _____ ones | _____ tens _____ ones |
| - _____ ones          | - _____ ones          |
| _____ tens _____ ones | _____ tens _____ ones |

Have a child use objects for grouping to show tens and ones for 32. Have another child write the numerals in the blanks of the first line. Say that you wish to take away 7 ones. Ask the children what must be done first. Lead them to suggest that one ten must be regrouped as ten ones. Have a child do this, remove 7 ones, and write the numeral in the blank of the second line. Ask how many tens and ones are left. Write the numerals in the blanks of the third line as you say, "There were 3 tens and 2 ones. How many ones were taken away? What symbol do we use to show these are to be taken away? How many tens and ones are left?"

Review the procedure for regrouping suggested for page 177 as you ask these questions and write the numerals. "What was

done with one of the tens? How many tens were left? How many ones were there then? How many ones are left when 7 ones are taken from 12 ones? How many tens and ones are left?"

- Write other exercises on the chalkboard and complete them with the children. Discuss each one. The following procedure is suggested for the exercise  $46 - 9$ .

"How many are being taken away from 4 tens 6 ones?"

"What must be done before we can take away 9 ones?"

"Show how 4 tens 6 ones can be renamed with more ones."

"Can we take 9 ones from 16 ones?"

"Show how many ones are left."

"Are there any tens to be taken away from 3 tens?"

"Show how many tens there are."

"What number is represented by 3 tens 7 ones?"

### Using the Page

- Discuss the completed exercise, using the procedure suggested in *Before Using the Page*. Ask why there is a loop around 5 ones and an arrow pointing outward. Have the children draw similar loops for the next two exercises. Then let them work independently.

Regroup to show ten more ones and subtract.

Think:



$$\begin{array}{r} \overset{3}{\cancel{4}} \text{ tens} \quad \overset{12}{\cancel{2}} \text{ ones} \\ - \quad \quad \quad 5 \text{ ones} \\ \hline \overset{3}{\cancel{3}} \text{ tens} \quad \overset{7}{\cancel{12}} \text{ ones} \\ \hline 37 \end{array}$$

| tens         | ones          |
|--------------|---------------|
| <del>3</del> | <del>12</del> |
| <del>4</del> | <del>2</del>  |
| <hr/>        |               |
|              | 5             |
| <hr/>        |               |
| 3            | 7             |

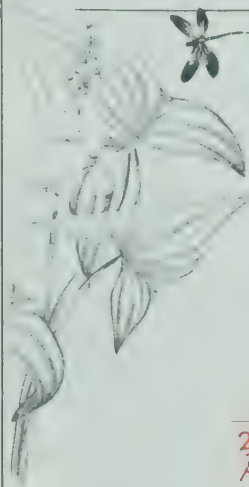
4 tens 2 ones  
Take away 5 ones.



$$\begin{array}{r} \overset{4}{\cancel{5}} \text{ tens} \quad \overset{16}{\cancel{6}} \text{ ones} \\ - \quad \quad \quad 8 \text{ ones} \\ \hline \overset{4}{\cancel{4}} \text{ tens} \quad \overset{8}{\cancel{16}} \text{ ones} \\ \hline 48 \end{array}$$

| tens         | ones          |
|--------------|---------------|
| <del>4</del> | <del>16</del> |
| <del>5</del> | <del>6</del>  |
| <hr/>        |               |
|              | 8             |
| <hr/>        |               |
| 4            | 8             |

5 tens 6 ones  
Take away 8 ones.



| tens         | ones          |
|--------------|---------------|
| <del>2</del> | <del>11</del> |
| <del>3</del> | <del>1</del>  |
| <hr/>        |               |
|              | 7             |
| <hr/>        |               |
| 2            | 4             |

| tens         | ones          |
|--------------|---------------|
| <del>5</del> | <del>13</del> |
| <del>6</del> | <del>3</del>  |
| <hr/>        |               |
|              | 8             |
| <hr/>        |               |
| 5            | 5             |

| tens         | ones          |
|--------------|---------------|
| <del>3</del> | <del>14</del> |
| <del>4</del> | <del>4</del>  |
| <hr/>        |               |
|              | 5             |
| <hr/>        |               |
| 3            | 9             |

| tens         | ones          |
|--------------|---------------|
| <del>6</del> | <del>15</del> |
| <del>7</del> | <del>5</del>  |
| <hr/>        |               |
|              | 7             |
| <hr/>        |               |
| 6            | 8             |

| tens         | ones          |
|--------------|---------------|
| <del>7</del> | <del>10</del> |
| <del>8</del> | <del>0</del>  |
| <hr/>        |               |
|              | 9             |
| <hr/>        |               |
| 7            | 1             |

| tens         | ones          |
|--------------|---------------|
| <del>8</del> | <del>12</del> |
| <del>9</del> | <del>2</del>  |
| <hr/>        |               |
|              | 6             |
| <hr/>        |               |
| 8            | 6             |

| tens         | ones          |
|--------------|---------------|
| <del>4</del> | <del>14</del> |
| <del>5</del> | <del>4</del>  |
| <hr/>        |               |
|              | 8             |
| <hr/>        |               |
| 4            | 6             |

| tens         | ones          |
|--------------|---------------|
| <del>2</del> | <del>11</del> |
| <del>3</del> | <del>1</del>  |
| <hr/>        |               |
|              | 5             |
| <hr/>        |               |
| 2            | 6             |

| t            | o             |
|--------------|---------------|
| <del>2</del> | <del>15</del> |
| <del>3</del> | <del>5</del>  |
| <hr/>        |               |
|              | 6             |
| <hr/>        |               |
| 2            | 9             |

| t            | o             |
|--------------|---------------|
| <del>3</del> | <del>16</del> |
| <del>4</del> | <del>6</del>  |
| <hr/>        |               |
|              | 7             |
| <hr/>        |               |
| 3            | 9             |

| t            | o             |
|--------------|---------------|
| <del>6</del> | <del>10</del> |
| <del>7</del> | <del>0</del>  |
| <hr/>        |               |
|              | 4             |
| <hr/>        |               |
| 6            | 6             |

| t            | o             |
|--------------|---------------|
| <del>7</del> | <del>14</del> |
| <del>8</del> | <del>4</del>  |
| <hr/>        |               |
|              | 7             |
| <hr/>        |               |
| 7            | 7             |

| t            | o             |
|--------------|---------------|
| <del>1</del> | <del>16</del> |
| <del>2</del> | <del>6</del>  |
| <hr/>        |               |
|              | 9             |
| <hr/>        |               |
| 1            | 7             |

Subtracting one-digit numbers from two-digit numbers regrouping

(one hundred seventy-nine) 179

## LESSON OUTCOME

Subtract one-digit numbers from two-digit numbers, regrouping, minuends to 99

## Materials

a long, narrow strip of paper for each child, objects for grouping by tens, models of 9 tens and 18 ones for each child

## RELATED ACTIVITIES

- You may wish to have the children illustrate the exercises on the page by using the number line and/or the hundred chart as suggested on pages T225 and T226.

Have the children in turn make a statement for each exercise as suggested in *Using the Page*.

- You may have children practise renaming one ten as ten ones on a sheet of paper folded in half and marked for tens and ones as shown.

| tens         | ones          |
|--------------|---------------|
| <del>4</del> | <del>12</del> |
| 3            | 6             |
| 8            | 0             |

## LESSON ACTIVITY

### Before Using the Page

- Review basic subtraction facts having minuends to 18 and the concept of expressing numbers from 10 to 18 as one ten and some ones.
- Write on the chalkboard the exercise given. Have the children use their models to help complete the exercise. Follow the procedure of asking questions similar to those suggested in the second activity in *Before Using the Page* on page T230.

$$\begin{array}{r} 3 \text{ tens} \quad 0 \text{ ones} \\ - \quad \quad \quad 6 \text{ ones} \\ \hline \quad \quad \text{tens} \quad \text{ones} \end{array}$$

| tens         | ones          |
|--------------|---------------|
| <del>2</del> | <del>10</del> |
| <del>3</del> | <del>0</del>  |
| <hr/>        |               |
|              | 6             |
| <hr/>        |               |
| 2            | 4             |

- Have each child fold a long, narrow strip of paper in half lengthwise and print *tens* at the top of the left half and *ones* at the top of right half. Show the children how to write the exercise

just discussed in the simple arrangement shown. Tell them this is a simpler form than that of writing the words *tens* and *ones* each time. The children have used this form for addition exercises.

Write several exercises on the chalkboard. Have the children copy and complete them. Encourage the children to do the work without using their models. You may wish to have the children draw a line along the fold in the strip to emphasize the two columns. Have children show the renaming and write the answers on the chalkboard. Discuss the results.

### Using the Page

- Discuss the completed exercise with the children. Have them trace over the dotted numerals and complete the work in the simpler arrangement. Then have a child make the statement: "Forty-two minus five equals thirty-seven." After the children have completed the next exercise, discuss it in a similar way. Then let the children work independently.



## LESSON OUTCOME

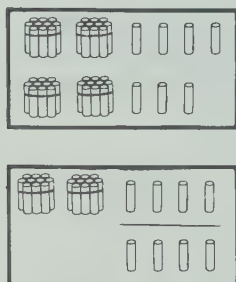
Subtract two-digit numbers, regrouping, minuends to 99

## Materials

objects for grouping by tens, models for 9 tens and 18 ones and a sheet of paper for each child

## RELATED ACTIVITIES

• If cards showing pictures of tens and ones were prepared as suggested in *Related Activities* on page T204, these may be used now. Have children select two cards, write a subtraction exercise, and then find the difference of the numbers represented. The children may need to be reminded that the greater number (minuend) is considered first.



| t            | o             |
|--------------|---------------|
| 3            | 17            |
| <del>4</del> | <del>13</del> |
| - 2          | 8             |
| 1            | 9             |

I have . I will take away . How many will be left?

| tens         | ones         |
|--------------|--------------|
| 4            | 13           |
| <del>1</del> | <del>7</del> |
| 3            | 6            |

Regroup and subtract.

4 tens 3 ones

Take away 1 ten 7 ones.

How many are left?

| tens         | ones         |
|--------------|--------------|
| 3            | 13           |
| <del>1</del> | <del>7</del> |
| 2            | 6            |

| tens         | ones         |
|--------------|--------------|
| 4            | 13           |
| <del>1</del> | <del>7</del> |
| 3            | 6            |

| tens         | ones         |
|--------------|--------------|
| 6            | 12           |
| <del>3</del> | <del>8</del> |
| 3            | 4            |

| tens         | ones         |
|--------------|--------------|
| 5            | 10           |
| <del>1</del> | <del>5</del> |
| 4            | 5            |

| tens         | ones         |
|--------------|--------------|
| 3            | 16           |
| <del>2</del> | <del>9</del> |
| 1            | 7            |

| tens         | ones         |
|--------------|--------------|
| 7            | 11           |
| <del>5</del> | <del>9</del> |
| 2            | 2            |

| tens         | ones         |
|--------------|--------------|
| 5            | 14           |
| <del>2</del> | <del>7</del> |
| 3            | 7            |

| tens         | ones         |
|--------------|--------------|
| 2            | 15           |
| <del>2</del> | <del>9</del> |
|              | 6            |

| tens         | ones         |
|--------------|--------------|
| 8            | 17           |
| <del>4</del> | <del>8</del> |
| 4            | 9            |

| tens         | ones         |
|--------------|--------------|
| 5            | 12           |
| <del>4</del> | <del>3</del> |
| 1            | 9            |

| tens         | ones         |
|--------------|--------------|
| 6            | 11           |
| <del>5</del> | <del>4</del> |
| 1            | 7            |

| tens         | ones         |
|--------------|--------------|
| 7            | 16           |
| <del>2</del> | <del>7</del> |
| 5            | 9            |

| tens         | ones         |
|--------------|--------------|
| 8            | 18           |
| <del>2</del> | <del>9</del> |
| 6            | 9            |

180 (one hundred eighty)

Subtracting two-digit numbers, regrouping

## LESSON ACTIVITY

## Before Using the Page

• Write on the chalkboard the exercise shown (A). Ask the children to copy it and tell how they would find the difference. Then have them complete the exercise. Ask several children to explain and show the work on the chalkboard. Have a child make the statement for the exercise: "Forty-three minus seven equals thirty-six."

| A | tens | ones | B | tens | ones |
|---|------|------|---|------|------|
|   | 4    | 3    |   | 4    | 3    |
|   | -    | 7    |   | - 1  | 7    |

• Write on the chalkboard the exercise shown (B). Some children may say that this is the same as the first exercise. Ask them to look carefully to find what is different about the second exercise. Lead them to suggest that the only difference is that one ten is being taken away.

Have the children use their models to display 4 tens and 3 ones. Ask what must be done before taking away 7 ones. Have

the children regroup one ten. Ask if they can take away 7 ones from 13 ones. Have them remove 7 ones. Ask how many tens are to be taken away. Have them remove 1 ten. Ask how many tens and ones are left and what number is represented.

Review the above procedure as you write the numbers to complete the exercise on the chalkboard. Point out that the numbers in the ones' column are subtracted first.

• Write other two-digit subtraction exercises on the chalkboard. Have the children fold a piece of paper in half as suggested on page T231, copy the exercises, and complete them. Let children use their models. Have children show the renaming and write the answers on the chalkboard.

## Using the Page

• Discuss the completed exercise with the children in a way similar to that suggested in *Before Using the Page* on page T230. Have the children complete the second exercise and discuss it in a similar way. Then let the children work independently.

# LESSON OUTCOME

Subtract two-digit numbers, regrouping, minuends to 99

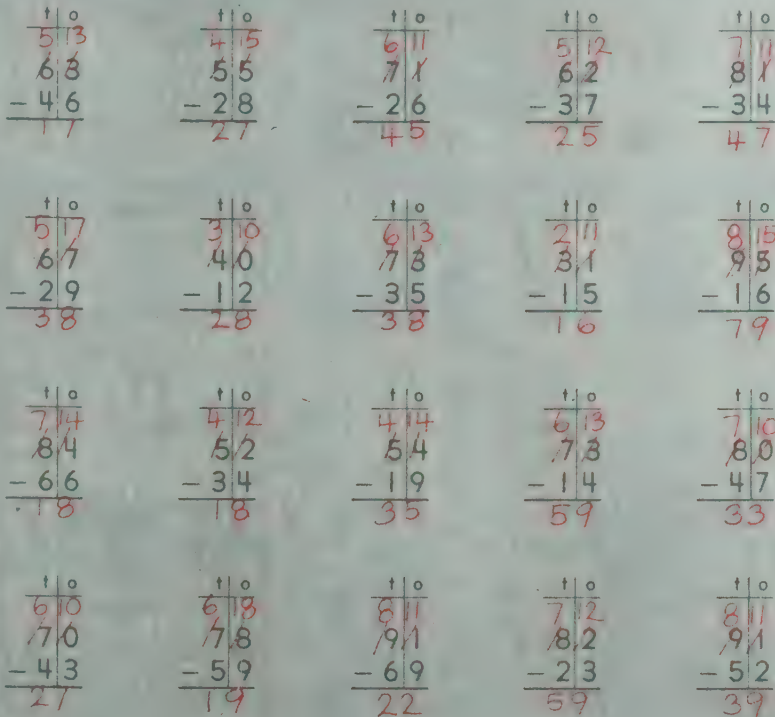
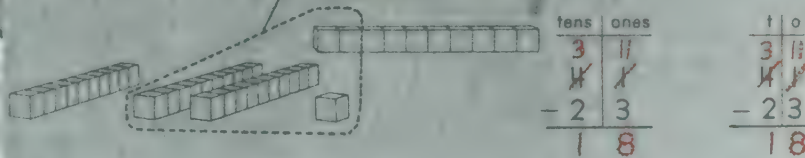
## Materials

display board, a chart for showing tens and ones, six sets of numeral cards for 0 to 9, one set of numeral cards for 10 to 18

## RELATED ACTIVITIES

- You may wish to keep the children's skill in basic addition facts sharp by having them do the activity suggested on page T247.

Regroup and subtract.



Subtracting two-digit numbers, regrouping

(one hundred eighty-one) 181

## LESSON ACTIVITY

### Before Using the Page

- Adapt the procedure for the first activity on page T204.

| tens | ones |
|------|------|
| 6    | 3    |
| — 2  | 5    |
|      |      |

| tens | ones |
|------|------|
| 5    | 13   |
| — 2  | 5    |
| 3    | 8    |

Place the numeral cards for 6 and 3 in the columns as shown and ask what number is represented. Repeat with the numeral cards for 2 and 5. Point out the symbol —, and remind the children that the number in the ones' column is subtracted first. Guide the children's thinking as follows:

- "What must be done before we can subtract 5 ones?"
- "How can we rename 6 tens 3 ones?"
- "Place a card for 5 on top of the card for 6."

"Place a card for 13 on top of the card for 3."

"Can we subtract 5 ones from 13 ones?"

"Place a card to show how many ones are left."

"Are there any tens to be subtracted?"

"Place a card to show how many tens are left."

"What number is represented by 3 tens 8 ones?"

Write the original subtraction

exercise on the chalkboard in the form shown. Ask the children what the "t" and "o" represent. Have

| t   | o |
|-----|---|
| 6   | 3 |
| — 2 | 5 |

one or more children help to complete the exercise by renaming one ten, subtracting, and writing the answer. Have a child make a statement about the numbers being subtracted.

### Using the Page

- Discuss the completed exercise with the children in the way suggested in *Before Using the Page*. After the children have traced over the dotted numerals, have a child make a statement about the numbers being subtracted. ("Forty-one minus twenty-three equals eighteen.") Then let the children work independently.

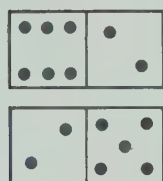
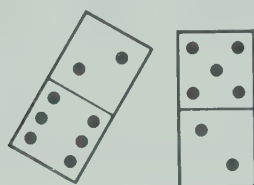


# LESSON OUTCOME

Use the standard form for subtracting two-digit numbers, regrouping, minuends to 99

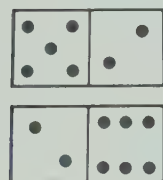
## RELATED ACTIVITIES

- Adapt the activity "Domino Addition", described on page T217, for subtraction of two-digit numbers. If the activity is treated as a game for two children, the player whose difference is less wins the round.



$$\begin{array}{r} 62 \\ - 25 \\ \hline \end{array}$$

or



$$\begin{array}{r} 52 \\ - 26 \\ \hline \end{array}$$

Gathered 62



Ate 39



How many more 's to eat ?

$$\begin{array}{r} 10 \\ 512 \\ - 39 \\ \hline 23 \end{array} \quad \begin{array}{r} 512 \\ - 39 \\ \hline 23 \end{array}$$

Regroup and subtract.

$$\begin{array}{r} 10 \\ 45313 \\ - 24 \\ \hline 29 \end{array} \quad \begin{array}{r} 413 \\ 53 \\ - 24 \\ \hline 29 \end{array}$$

$$\begin{array}{r} 10 \\ 78515 \\ - 17 \\ \hline 68 \end{array} \quad \begin{array}{r} 715 \\ 85 \\ - 17 \\ \hline 68 \end{array}$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| $\begin{array}{r} 314 \\ 44 \\ - 18 \\ \hline 26 \end{array}$ | $\begin{array}{r} 810 \\ 90 \\ - 45 \\ \hline 45 \end{array}$ | $\begin{array}{r} 512 \\ 62 \\ - 56 \\ \hline 6 \end{array}$  | $\begin{array}{r} 715 \\ 85 \\ - 78 \\ \hline 7 \end{array}$  | $\begin{array}{r} 117 \\ 27 \\ - 19 \\ \hline 8 \end{array}$  | $\begin{array}{r} 812 \\ 92 \\ - 68 \\ \hline 24 \end{array}$ |
| $\begin{array}{r} 513 \\ 63 \\ - 47 \\ \hline 16 \end{array}$ | $\begin{array}{r} 614 \\ 74 \\ - 27 \\ \hline 47 \end{array}$ | $\begin{array}{r} 311 \\ 41 \\ - 22 \\ \hline 19 \end{array}$ | $\begin{array}{r} 212 \\ 32 \\ - 17 \\ \hline 15 \end{array}$ | $\begin{array}{r} 710 \\ 80 \\ - 56 \\ \hline 24 \end{array}$ | $\begin{array}{r} 716 \\ 86 \\ - 49 \\ \hline 37 \end{array}$ |
| $\begin{array}{r} 615 \\ 75 \\ - 19 \\ \hline 56 \end{array}$ | $\begin{array}{r} 411 \\ 51 \\ - 45 \\ \hline 6 \end{array}$  | $\begin{array}{r} 213 \\ 33 \\ - 29 \\ \hline 4 \end{array}$  | $\begin{array}{r} 117 \\ 27 \\ - 8 \\ \hline 19 \end{array}$  | $\begin{array}{r} 712 \\ 82 \\ - 25 \\ \hline 57 \end{array}$ | $\begin{array}{r} 613 \\ 73 \\ - 38 \\ \hline 35 \end{array}$ |
| $\begin{array}{r} 811 \\ 91 \\ - 79 \\ \hline 12 \end{array}$ | $\begin{array}{r} 410 \\ 50 \\ - 33 \\ \hline 17 \end{array}$ | $\begin{array}{r} 415 \\ 55 \\ - 16 \\ \hline 39 \end{array}$ | $\begin{array}{r} 214 \\ 34 \\ - 5 \\ \hline 29 \end{array}$  | $\begin{array}{r} 716 \\ 86 \\ - 67 \\ \hline 19 \end{array}$ | $\begin{array}{r} 818 \\ 98 \\ - 59 \\ \hline 39 \end{array}$ |

182 (one hundred eighty-two)

Using the standard form for subtraction

## LESSON ACTIVITY

### Before Using the Page

- In this lesson the children are introduced to the standard algorithm for subtracting two-digit numbers.

Write an exercise on the chalkboard similar to the one at the top of page 182. Have the children copy and complete it. Have a child show the work on the chalkboard and explain the necessary renaming of the minuend for finding the difference. Have another child make a statement about the two numbers and their difference; for example, "Thirty-six minus nineteen equals seventeen."

Explain to the children that the headings "t" and "o" are not really necessary, nor is the vertical line separating the numerals into two columns. Rewrite the exercise on the chalkboard in the standard form. Find the difference of the two numbers again, relating each step of the procedure to the steps that were used the first time.

Write another exercise in the standard form on the chalkboard and have children help to write the numerals to complete the

subtraction. Then write several exercises for the children to copy and attempt on their own.

### Using the Page

- Have children help to read the word problem. Discuss the two forms of the solution shown and have the children trace over the dotted numerals.

Have a child read the two numbers in the first of the two frames and make up a story using these numbers. Have the children complete the subtraction, using the two forms shown at the upper right. Repeat the procedure for the next exercise. Then let the children work independently.

- After the children have completed the page or the required number of exercises, you may wish to ask these questions:

"How many answers have 1 in the tens' place?"  
 "How many answers have 0 in the ones' place?"  
 "How many answers are less than 10?"  
 "How many answers are greater than 50?"  
 "How many answers are between 20 and 50?"

**LESSON OUTCOME**

Compare the mass of an object with one kilogram

**Materials**

one or more masses of one kilogram, various objects for comparing masses, kitchen scale that measures kilograms, containers having one kilogram of dry materials, the objects illustrated on the page or suitable substitutes

**Vocabulary**

kilogram (kg)

**RELATED ACTIVITIES**

- Have children draw pictures of objects or cut pictures from magazines and catalogues. Have them sort the pictures into objects that are heavier than one kilogram and those that are lighter than one kilogram. These can be pasted on a chart for a bulletin-board display.
- Have children use a scale to determine their own masses in kilograms. Make certain that the scale is at zero before the children use it. Have the children read each mass to the nearest kilogram. Ask each child to compare her/his mass with that of another child and state who is heavier and who is lighter.

Ring each object that has a mass of more than a kilogram.



Check each object that has a mass of less than a kilogram.

Answers will vary.



SKIM MILK



Comparing masses to one kilogram

(one hundred eighty-three) 183

**LESSON ACTIVITY****Before Using the Page**

- Several days before teaching this lesson, display one or more kilogram masses marked with the label "one kilogram" and also "1 kg". Encourage the children to lift the mass in their spare time and become accustomed to how heavy it seems to them. They may compare the kilogram mass with other suitable objects and state which feels heavier.
- Begin a formal discussion after all the children have had an opportunity to lift the kilogram mass. Introduce the word *kilogram* and, if you wish, the symbol "kg". Print them on the chalkboard. Emphasize that the symbol "kg" is always read as "kilogram" or "kilograms". Ask the children whether they think the kilogram mass is light or heavy. Ask whether they can lift the mass with one hand or whether they need two hands.
- Display a kilogram mass, some large objects, and some small objects. Ask children to choose objects they think are lighter than one kilogram. Have them check by holding an object in one hand and the kilogram mass in the other.

If possible, obtain a kitchen scale that measures in kilograms. Place the one-kilogram mass on the scale and point out how the indicator stops at the large numeral 1. Then place one of the objects on the scale and see whether the indicator stops before, on, or after the numeral 1. You may also wish to use balance scales for comparing large, bulky objects with the one-kilogram mass.

- Repeat the preceding activity and have children select objects they think are heavier than one kilogram.
- If possible, display containers holding one kilogram of dry materials, such as rice, flour, sugar, or salt. Let the children lift these. They will observe that a greater quantity of some materials than others is required for a mass of one kilogram.

**Using the Page**

- Read the two instructions to the children. Have them identify each object on the page. Each object is to be compared with a one-kilogram mass. It is implied that the containers for liquids are full. Let each child, in turn, compare the mass of each object with a one-kilogram mass. Have the children mark the pictures of the objects on the page according to their findings.



LESSON OUTCOME

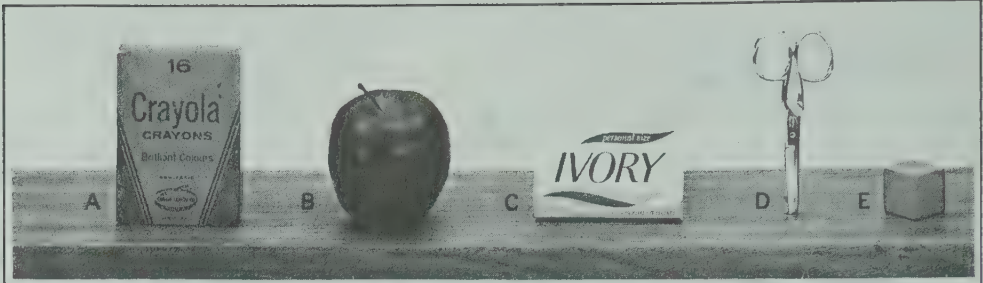
Estimate how many of a given object are equivalent to one kilogram; measure to check an estimate of mass

Materials

a one-kilogram mass, kitchen scale or balance scales, oranges and other fruits and vegetables, special chart for each child, a number of each of the objects illustrated on the page or suitable substitutes

RELATED ACTIVITIES

• You may wish to have children prepare a set of masses for themselves by using Plasticine and the balance scales. Enough Plasticine is placed in one pan to balance the one-kilogram mass. The Plasticine is then divided into two parts, placed on the scales, and adjusted until the two parts balance. Each part will have a mass of one-half of a kilogram. By subdividing one of the halves in the same way, two one-fourth kilogram masses will be obtained. Children may experiment with these to balance various objects in the classroom.



Answers will vary.

How many do you need for one kilogram ?

|   | Estimate    | Measurement |
|---|-------------|-------------|
| A | about _____ | about _____ |
| B | about _____ | about _____ |
| C | about _____ | about _____ |
| D | about _____ | about _____ |
| E | about _____ | about _____ |

184 (one hundred eighty-four)

Estimating and measuring a mass of one kilogram from given masses

LESSON ACTIVITY

Before Using the Page

- Display the one-kilogram mass with the label concealed and ask what the name of the mass is. Have children recall objects that are heavier than one kilogram and others that are lighter than one kilogram. Ask them to suggest items that are sold by the kilogram.
- Display the kitchen scale or the balance scales and the one-kilogram mass. Work with children in small groups. Place an orange beside the one-kilogram mass. Have children state whether they think the orange is lighter than or heavier than one kilogram. Ask the children to pretend that they are buying one kilogram of oranges. Place oranges on the scales, one at a time, until one kilogram is indicated. Ask children to count the oranges. Write the results in a chart on the chalkboard. Repeat for other fruits and vegetables.
- After many observations from the preceding activity, the children may be able to make a reasonable estimate before counting the objects that will balance one kilogram. Have them write their estimate of the mass first and then measure the mass.

Prepare charts in advance and give one copy to each child. The chart will indicate the objects to be used. Children may enjoy choosing other suitable objects.

| How many make one kilogram? |          |             |
|-----------------------------|----------|-------------|
| Object                      | Estimate | Measurement |
| toy cars                    |          |             |
| hockey pucks                |          |             |

Using the Page

- The objects illustrated on the page should be provided in separate containers. If you wish to use other objects, you should determine how many of each are needed for one kilogram before you assign the page.
- Have children write their estimates first. Let them lift the objects when making their estimates. After all the estimates have been made, have the children place objects on the balance scales to determine how many are needed for one kilogram.

# LESSON OUTCOME

Subtract two-digit numbers, regrouping, minuends to 99

## Materials

models for tens and ones

## RELATED ACTIVITIES

- Have the children complete patterns similar to those shown below.

| -  | 7 | 17 | 27 | 37 |
|----|---|----|----|----|
| 54 |   |    |    |    |
| 64 |   |    |    |    |
| 74 |   |    |    |    |

| -  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----|---|---|---|---|---|---|---|---|---|---|
| 10 |   |   |   |   |   |   |   |   |   |   |
| 20 |   |   |   |   |   |   |   |   |   |   |
| 30 |   |   |   |   |   |   |   |   |   |   |



For an answer that is greater than 20 and less than 30, color the top of the acorn brown.

Subtraction practice: minuends to 99

(one hundred eighty-five) 185

## LESSON ACTIVITY

### Before Using the Page

- Conduct a quick oral review of subtraction facts having minuends to 9 and then the facts having minuends from 10 to 18.
- Write the following subtraction exercises on the chalkboard.

$$\begin{array}{r} 32 \\ - 17 \\ \hline \end{array} \quad \begin{array}{r} 63 \\ - 44 \\ \hline \end{array} \quad \begin{array}{r} 40 \\ - 9 \\ \hline \end{array} \quad \begin{array}{r} 50 \\ - 20 \\ \hline \end{array} \quad \begin{array}{r} 86 \\ - 24 \\ \hline \end{array}$$

Have the children copy the exercises and complete them. Watch to see what they do for the last two exercises since renaming is not necessary for subtracting. You may need to review the procedure using models of tens and ones and/or drawing a vertical line to separate the tens' digits from the ones' digits, to illustrate why renaming of the minuend is not necessary. Have children write the answers on the chalkboard and tell the procedure that was used.

### Using the Page

- You may wish to divide the exercises into two parts and have the children do them on different days. Let the children work

independently on the page while you observe and help those who are having difficulty. These children may draw the vertical lines to separate the tens' digits and the ones' digits, and use models of tens and ones to obtain their answers. It is important that children understand the procedure before they have practice. Extra time spent on the development of understanding should reduce the amount of practice required later.

After the children have completed the exercises, read the instruction at the bottom of the page. Have children state answers for which the tops of acorns are to be colored; for example, 21, 22, 23, 24, . . . , 29. After they have finished the coloring, ask how many acorns there are on the page. Print the numeral on the chalkboard. Ask the children to count how many brown acorn "hats" there are. Print the numeral on the chalkboard. Have the children turn over their pages. Ask them how they might find out how many acorn "hats" are not colored, without looking at the page and counting them.



## LESSON OUTCOME

Subtract amounts of money, regrouping, minuends to 99 cents

### Materials




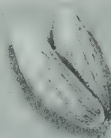


real money, play money, or coin cutouts from copies of page T327, flash cards showing dimes and pennies (amounts to 99 cents) and prices to 99¢, pairs of cards showing equivalent amounts in dimes and pennies

### Vocabulary


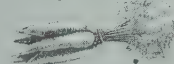
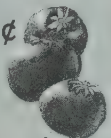
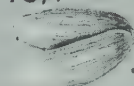
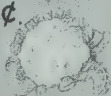



carrots, broccoli, tomatoes, cucumbers, cauliflower, corn

## RELATED ACTIVITIES

• Prepare work sheets indicating amounts of money available for spending. Have the children use the play store or a store chart with items having prices to 99¢. For each amount on the work sheet, have the children buy one item, record the price, and determine the amount of money that would be left.

|  |  |   |  |  |  |
|--|--|---|--|--|--|
|  |  |  |  |  |  |
| 29¢  | 44¢  | 36¢   | 18¢  | 57¢  | 45¢  |

Complete.

|  |  |
|--|--|
| <p>I have 50¢.</p> <p>I buy  45¢</p> <p>I have <u>5</u>¢ left. 5¢</p>     | <p>I have 44¢.</p> <p>I buy  29¢</p> <p>I have <u>15</u>¢ left. 15¢</p>   |
| <p>I have 52¢.</p> <p>I buy  36¢</p> <p>I have <u>16</u>¢ left. 16¢</p>   | <p>I have 73¢.</p> <p>I buy  18¢</p> <p>I have <u>55</u>¢ left. 55¢</p>   |
| <p>I have 96¢.</p> <p>I buy  57¢</p> <p>I have <u>39</u>¢ left. 39¢</p>   | <p>I have 81¢.</p> <p>I buy  44¢</p> <p>I have <u>37</u>¢ left. 37¢</p>   |
| <p>I have 70¢.</p> <p>I buy  57¢</p> <p>I have <u>13</u>¢ left. 13¢</p> | <p>I have 35¢.</p> <p>I buy  18¢</p> <p>I have <u>17</u>¢ left. 17¢</p> |

186 (one hundred eighty-six)

Subtracting with money, regrouping, amounts to 99 cents

## LESSON ACTIVITY

### Before Using the Page

- Display sets of dimes and pennies for amounts to 99 cents. Have children determine the value of each set of coins. Then display flash cards showing numbers of dimes and pennies, for example, 2 dimes 3 pennies. Have children state the amount of money for each (23 cents).
- Display cards showing prices to 99¢. Have children state the number of dimes and the number of pennies for each amount.
- Display pairs of cards similar to those shown and ask if the amounts are the same or different.

|                        |
|------------------------|
| 4 dimes      8 pennies |
|------------------------|

|                         |
|-------------------------|
| 3 dimes      18 pennies |
|-------------------------|

If necessary, use dimes and pennies to represent each amount. Point out that when one dime is removed and replaced by ten pennies, the amount of money is the same. Have children state the amount for each pair.

- Have each child display 2 dimes and 3 pennies. Ask them to pretend that they are to give five pennies to a friend. Ask what they would have to do first in order to obtain five pennies. Have them exchange one dime for ten pennies and then remove five pennies. Ask what coins are left. Review the procedure that was used by writing statements on the chalkboard as shown. Ask how much money each group of coins represents.

|         |           |      |
|---------|-----------|------|
| 1       | 13        | 113  |
| 2 dimes | 3 pennies | 23¢  |
| -       | 5 pennies | - 5¢ |
| 1 dime  | 8 pennies | 18¢  |

- Write exercises similar to the following on the chalkboard.

|      |       |       |      |       |
|------|-------|-------|------|-------|
| 50¢  | 42¢   | 41¢   | 45¢  | 53¢   |
| - 6¢ | - 16¢ | - 14¢ | - 8¢ | - 29¢ |

Have children tell how they would find the amount of money left. Then have them copy and complete the exercises.

### Using the Page

- Have children identify the items pictured at the top of the page (carrots, broccoli, tomatoes, cucumbers, cauliflower, corn) and their prices. Discuss the first exercise and then let the children work independently.

Use 50¢ to buy each item.  
Count on to make change.

I buy

| Item                      | Price | Coins given as change | Value of coins |
|---------------------------|-------|-----------------------|----------------|
| BUSH BEANS / FEVES VERTES | 36¢   |                       | 11¢            |
| TOMATO / TOMATE           | 44¢   |                       | 6¢             |
| SWEET CORN / MAIS SUCRE   | 39¢   |                       | 11¢            |
| LETTUCE / LAITUE          | 28¢   |                       | 22¢            |
| RADISH / RADIS            | 32¢   |                       | 18¢            |
| BROCCOLI / BROCOLI        | 43¢   |                       | 7¢             |
| PUMPKIN / CITROUILLE      | 47¢   |                       | 3¢             |
| CUCUMBER / CONCOMBRE      | 35¢   |                       | 15¢            |

Making change from 50 cents

(one hundred eighty-seven) 187

## LESSON OUTCOME

Make change from 50 cents by  
using the method of counting on

## Materials

real money, play money, or coin cutouts  
from copies of page T327, play store or  
store chart, work sheets showing charts

## RELATED ACTIVITIES

- If you have a play store, display items having prices from 26¢ to 49¢. Have the children use two quarters to buy one item. The storekeeper must give the correct change by counting on aloud.
- Groups of two to four children may play the game "Corner Store" described on page T247. Prepare the game board by drawing or pasting pictures of items (or print the names of the items) and indicate their prices.

Some examples are as follows:

|        |     |          |     |
|--------|-----|----------|-----|
| pad    | 14¢ | chalk    | 12¢ |
| book   | 41¢ | ruler    | 21¢ |
| paste  | 28¢ | eraser   | 9¢  |
| paper  | 36¢ | binder   | 33¢ |
| case   | 37¢ | clip     | 4¢  |
| pen    | 22¢ | scissors | 19¢ |
| crayon | 7¢  | pencil   | 15¢ |

## LESSON ACTIVITY

## Before Using the Page

- Display one each of a penny, nickel, dime, and quarter. Have children identify each by name and state its value.
- Write 10¢ on the chalkboard. Have a child show a set of coins having this value. Ask other children in turn to show a different set of coins having the same value, until the four possible sets are shown (10 pennies, 5 pennies and 1 nickel, 2 nickels, 1 dime). Ask the children to tell you which set has the fewest coins. Ask children to show sets of coins having values to 50 cents so that the fewest coins are used each time. Include all the multiples of five to 45 cents.
- Work with small groups of children at the play store or use the store chart. Prepare work sheets showing this chart and give a copy to each child.

|             |     |
|-------------|-----|
| I have      | 50¢ |
| I spend     | 22¢ |
| I have left | 28¢ |
|             |     |

Have each child buy an item, record the price, subtract to find the amount that would be left, and draw the fewest coins for that amount. As indicated, each child begins at 50¢. After the children have finished, show them how to begin with the number for the amount of money spent, and count on to 50, using the coins drawn to indicate the change. In this case, the child would say, "I spent 22¢. Twenty-three, twenty-four, twenty-five, fifty."

- Write this problem on the chalkboard: "I have 50¢. I spend 32¢. How much do I have left?" Explain how the amount left can be found not by subtracting but by counting on to 50. Use real coins to count on from 32 as you have the children say, "33, 34, 35, 40, 50." Have the children determine the value of the coins. Give similar problems to the children and have them use coins to count on to 50 and then indicate the value of the coins.

## Using the Page

- Discuss the first exercise with the children. Ask what coin was not needed. Have them determine the value of the coins that were needed. Then let the children work independently.



## LESSON OUTCOME

Identify slides

### Materials

wooden or plastic three-dimensional models, a slightly inclined surface, attribute blocks, straight edge, a work sheet for each child, playing cards, acetate and overhead projector (optional), copies of the shapes for page 188 from page T346

### Vocabulary

slide up, slide down, slide left, slide right, fit

## RELATED ACTIVITIES

- Use one or more of the activities described on page T247.
- Give commands to the children, some of which are prefaced by the words "Simon says". The children are to obey only those commands with the special preface. Children who obey commands without the special preface withdraw from the game. The commands involve slide movements—slide up, slide down, slide right, slide left.

When the children have had some practice, you may wish to ask one child to be the leader.

The red shape can slide to fit the other shapes.  
Ring the words that tell how.

Slide down  
Slide up  
Slide left  
Slide down  
Slide left  
Slide right

Slide down

Slide left

Slide right

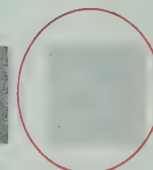
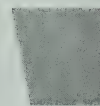
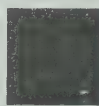


Slide down

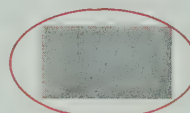
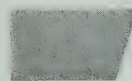
Slide up

Slide right

Slide the red shape to the right.  
Ring the shapes it fits.



Slide the red shape to the left.  
Ring the shapes it fits.



188 (one hundred eighty-eight)

Identifying slides

## LESSON ACTIVITY

### Before Using the Page

• Print the word *slide* on the chalkboard and give examples of objects that move by sliding, demonstrating wherever possible. For example, some windows slide up and down, some windows slide left and right, a drawer slides in and out, a matchbox in its sleeve slides in and out, elevator doors slide to open and shut, and the elevator itself slides up and down in the shaft. Point out that when an object slides it does not turn. Also, the path of a slide is straight, not curved.

• Work with the children in small groups, using one or more of the following activities to demonstrate the concept of a slide. For sliding an object, move it with your hand to prevent it from turning, rather than letting it slide freely.

Have children slide attribute blocks on a table, using a straight edge as a guide. Use instructions such as "Slide up. Slide down. Slide left. Slide right."

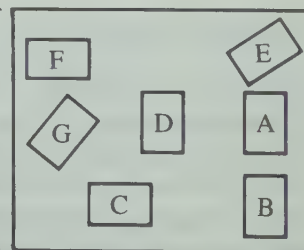
• Prepare a work sheet by tracing around a card from a pack of playing cards.

You may also prepare a copy of the sheet on acetate and use the overhead projector to demonstrate the procedure described below.

Give each child a copy of the sheet and one playing card. Have them place the card on top of shape A. Say, "Start at shape A and slide the card down. What shape does the card fit?" "Start at shape A and slide the card to fit shape D. In which direction did the card move?" "Start at shape A and slide the card up. Which shape does not fit the card?" "Start at shape B. Slide the card up one shape. Now slide the card to the left. Which shape does the card fit? Slide the card left again. Does the card fit?"

### Using the Page

• Read the instructions and make certain the children understand what they are to do. Give each child a copy of the shapes from page T346. Have them cut out the shapes and use them to help determine the answers.

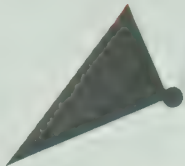


The red shape can turn about the ●.  
Can the red shape turn to fit the blue shape?



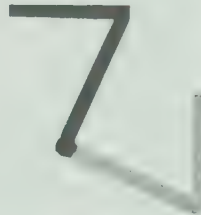
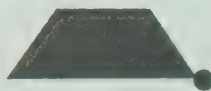
Yes No

Yes No



Yes No

Yes No



Yes No

Yes No

Yes No

Identifying turns

(one hundred eighty-nine) 189

## LESSON OUTCOME

Identify turns

### Materials

display board, sheets of paper, pins, cutouts of letters, numerals, and shapes, sheets showing pairs of shapes for a discussion of turns, copies of the shapes for page 189 from page T346

### Vocabulary

turn

## RELATED ACTIVITIES

- Adapt the game "Simon Says" described on page T240. Use commands such as "Turn to the right," "Turn to the left," "Make a half turn."

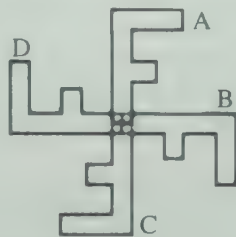
## LESSON ACTIVITY

### Before Using the Page

- Remind the children that for the previous page they were permitted to slide objects in a straight path and that no turns were permitted. Tell them that for this page they will be turning objects, but they will not be permitted to slide the objects or flip them over.

- Attach a large sheet of paper to the display board. Display a cardboard cutout of the letter F. Have the children identify it. Show them how to use a pin to hold the letter to the paper on the display board, allowing the letter to turn but not to slide.

Start with the letter in its normal position (A), and have a child turn it to the right (position B). Start at position A again and have a child turn it to the left (position D). Start at position A and have a child give the letter a half turn (position C). Have



other children turn the letter according to your instructions. Review the procedure by turning the letter through the positions and tracing around each position on the sheet of paper.

Repeat the procedure using cutouts of other letters, numerals, and shapes.

- On several sheets of paper, trace around shapes used in the previous activity. Place two identical shapes in positions similar to those shown on page 189. Indicate the position of the pin by a large dot where the two shapes touch. Fasten the sheets to the display board. Have children use a pin and the shape that matches those on each sheet to test whether the shape can start from one position and turn to fit the second position.

### Using the Page

- Read the statements and discuss what the children are to do. Give each child a copy of the shapes from page T346 and a pin. The children can place the pin through the shape and the black dot, and then turn the shape to test whether the red shape fits the blue shape.



## LESSON OUTCOME

Count the units of area required to cover a surface

### Materials

cutouts of various geometric shapes, newspapers, books, envelopes, sheets of paper, playing cards, index cards, gummed square shapes, postage stamps, squared paper

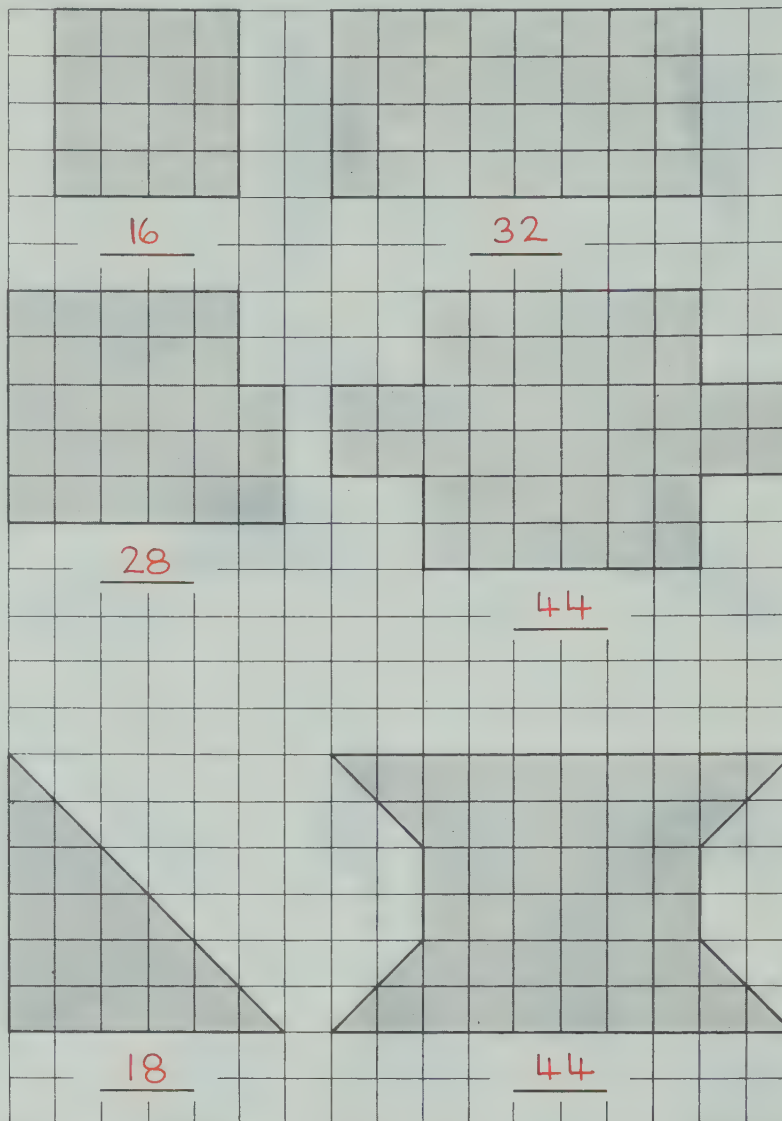
### Vocabulary

tile, overlap, surface, square units

## RELATED ACTIVITIES

- Have children trace around irregularly shaped objects (leaves) and regularly shaped objects (attribute blocks) on squared paper and count the squares.
- Have the children help one another to trace around their bodies on large sheets of paper. Have them cut out each shape and cover it with squares measuring 4 cm on each side. Have the children count the squares.

Count the square units that each shape covers.



190 (one hundred ninety)

Counting square units covered by a shape

## LESSON ACTIVITY

### Before Using the Page

• The idea of tiling was suggested for exploration in *Related Activities* on page T65. For this lesson, tiling is re-examined as a foundation for the concept of area.

Certain shapes are more suitable than others for covering a surface as completely as possible without overlapping because the shapes will tile (fit together without leaving any gaps). Cut-outs of shapes can be used by children to discover those that tile and those that do not. Shapes to consider are circles, squares, all kinds of triangles, rectangles, parallelograms, regular pentagons, regular hexagons, and regular octagons. Store the shapes in individual boxes or envelopes. Children can experiment with these in their spare time and find which shapes will tile and thus are suitable for covering a surface.

• If the children have had little experience covering surfaces using non-standard units, give them an opportunity to try some of the activities suggested below. After each surface is covered, have the children count the units used.

1. Cover a section of the floor with sheets of newsprint.
2. Cover a desk or a table top with identical books.
3. Cover a bulletin board with identical sheets of paper.
4. Cover a notebook with playing cards.
5. Cover an index card with gummed squares or postage stamps.
6. Count the tiles in a given section of the floor.

• Give each child a four-by-four or six-by-six section of squared paper. Have them count the squares. Have them fold the sheet in half (with the fold parallel to one edge) and count the squares in each half. Have them unfold the sheet and fold it in half again (with the fold along a diagonal) and count the squares in each half. Let them consider how to deal with the halves of squares.

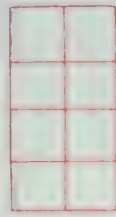
### Using the Page

• Have the children count the squares that each shape covers and record the number. You may wish to have children demonstrate how to count the squares for some shapes by twos. Discuss the fact that some shapes cover more square units than others and therefore they are larger. Ask how many square units are covered by the largest shape and by the smallest shape.

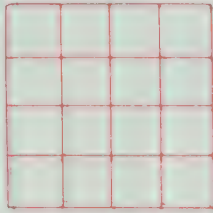
How many square units are inside each shape?



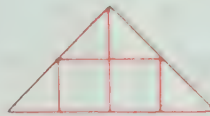
4



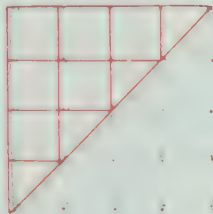
6



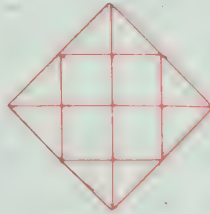
16



4



8



8

Counting square units inside a shape

(one hundred ninety-one) 191

## LESSON OUTCOME

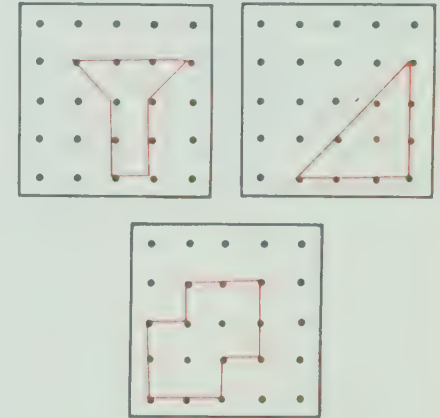
Count the square units contained by a shape

### Materials

a geoboard and rubber bands (various colors, if possible) for each child, copies of page T341 or T342 for geopaper

## RELATED ACTIVITIES

- Have the children use the geoboards and make any shape that contains seven unit squares. Have them copy the shape onto geopaper and color it. Repeat for shapes containing other numbers of unit squares. Display the shapes.
- Make a shape on geopaper and have the children copy it onto geoboard. Have them determine the number of small squares that would fit the shape. Repeat the activity several times.



## LESSON ACTIVITY

### Before Using the Page

- Work with groups of children according to the number of geoboards that are available. Each child should have a geoboard and several colored rubber bands. If you have no geoboards, use copies of page T341 or T342 for geopaper.

Review the square, rectangle, and triangle with the children by showing these shapes on a demonstration geoboard. Have the children copy the shapes onto their geoboards and identify them. Ask how many sides and how many corners there are for each shape. Ask what is true about the lengths of the sides of a square.

- Have the children use a rubber band to make the smallest square they can on the geoboard. Ask how many pegs the rubber band touches (4).

Ask the children to make a square on a different part of the geoboard, using another rubber band that touches eight pegs. Ask them how many of the small squares would fit the larger square. They may check their answers by using rubber bands to divide the larger square into four small squares.

Have the children remove all the rubber bands except the one forming the small square. Ask them to make a rectangle so that the rubber band touches eight pegs. Ask how many of the small squares would fit the rectangle.

### Using the Page

- Have the children determine the number of square units inside each shape. They may draw lines as shown on the first geoboard. If you wish, children may copy the shape onto their geoboards first. Children having difficulty with shapes that show halves of unit squares may find it easier to count all the unit squares first and then combine two halves and count these as whole squares. Discuss the results obtained.



## LESSON OUTCOME

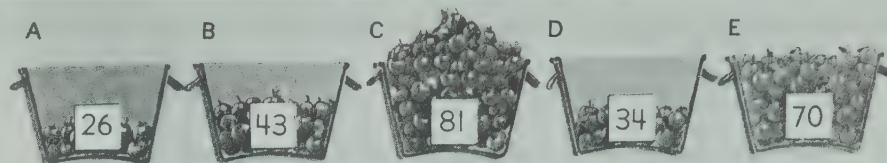
Subtract two-digit numbers, regrouping, minuends to 99

## Materials

numeral cards for several two-digit numbers greater than 20 and a box

## RELATED ACTIVITIES

• The activity in *Before Using the Page* may be adapted for use with two sets of numeral cards for 0 to 9. Place each set of cards in a bag, one for each of two players. Each player draws two cards from her/his bag at random and places them so that the numerals form the greater of the two numbers possible. For example, if the numeral cards for 4 and 9 are drawn, the player will place them to represent the number 94 rather than the number 49. Then the players discuss their numbers to see whose is greater. The player whose number is greater may win one point if he/she can write a subtraction exercise and find out how much greater his/her number is. After five rounds, the children may ask you to check their work, if necessary, and award points to determine the winner.



Compare the baskets.

A and D

D has more.

How many more? 8

$$\begin{array}{r} 26 \\ 24 \\ \hline 2 \\ 8 \end{array}$$

A and B

B has more.

How many more? 17

$$\begin{array}{r} 43 \\ 26 \\ \hline 17 \end{array}$$

B and C

C has more.

How many more? 38

$$\begin{array}{r} 81 \\ 43 \\ \hline 38 \end{array}$$

A and C

C has more.

How many more? 55

$$\begin{array}{r} 81 \\ 26 \\ \hline 55 \end{array}$$

D and E

E has more.

How many more? 36

$$\begin{array}{r} 70 \\ 34 \\ \hline 36 \end{array}$$

A and E

E has more.

How many more? 44

$$\begin{array}{r} 70 \\ 26 \\ \hline 44 \end{array}$$

C and D

C has more.

How many more? 47

$$\begin{array}{r} 81 \\ 34 \\ \hline 47 \end{array}$$

B and D

B has more.

How many more? 9

$$\begin{array}{r} 43 \\ 34 \\ \hline 9 \end{array}$$

192 (one hundred ninety-two)

Subtraction practice: minuends to 99

## LESSON ACTIVITY

## Before Using the Page

• Prepare several numeral cards for two-digit numbers greater than 20 and place the cards in a box. Have one child draw a card from the box and state the number. Have a second child draw a card and state the number. Tell the children to pretend that each number tells how many times they bounced a ball. Ask which child bounced a ball more times. Ask how they can find out how many more times. Lead the children to suggest that they can subtract the numbers and that the difference will tell how many more times one ball was bounced. Have the children write the subtraction exercise, show the renaming (if required), and find the difference. Review the problem by saying, for example, "Ann bounced a ball 43 times. Jane bounced a ball 26 times. Ann bounced a ball 17 more times than Jane."

Repeat the above procedure several times. Have the child who draws the first card for each problem tell what the situation is to be; for example, the number of times a rope was jumped, a bell was rung, a song was sung, a toe was tapped. As each problem is stated, have the children write the subtraction exercise and

find the difference. Have a child write the subtraction exercise on the chalkboard and explain the procedure used to find the difference.

## Using the Page

• Have children read the numerals that show how many apples there are in each basket. You may wish to review the ordinal number concepts *first* to *fifth* by asking questions similar to the following:

"How many apples are there in the second basket?"

"Which basket has 34 apples?"

"Which basket has more apples, the second or the fourth?"

"Does the third basket have ten more apples than the fifth basket?"

Discuss the first exercise with the children so that they will know the procedure involved. Then let them work independently.

Add or subtract.

Addition and subtraction practice sums and minuends to 99

(one hundred ninety-three) 193

## Page 193

### OBJECTIVE

Add and subtract two-digit numbers, regrouping, sums and minuends to 99

### Materials

objects for grouping by tens, a chart for showing tens and ones, six sets of numeral cards for 0 to 9, one set of numeral cards for 10 to 18

### RELATED ACTIVITIES

• Prepare copies of the following chart accompanied by the exercises in the order given below. Tell the children that they may complete them in any order and as each answer is found it is to be marked with an X on the chart. When the children have marked five answers in a row they may say, "Mission Accomplished".

$$12 + 4 = \underline{\quad}$$

$$20 - 17 = \underline{\quad}$$

$$17 - 6 = \underline{\quad}$$

$$18 + 7 = \underline{\quad}$$

$$6 + 13 = \underline{\quad}$$

$$10 - 9 = \underline{\quad}$$

$$10 + 11 = \underline{\quad}$$

$$12 + 12 = \underline{\quad}$$

$$9 + 5 = \underline{\quad}$$

$$20 - 10 = \underline{\quad}$$

$$13 - 8 = \underline{\quad}$$

$$3 + 9 = \underline{\quad}$$

$$11 - 4 = \underline{\quad}$$

$$9 + 9 = \underline{\quad}$$

$$15 - 6 = \underline{\quad}$$

|   |    |    |    |    |
|---|----|----|----|----|
| 4 | 7  | 12 | 17 | 21 |
| 1 | 8  | 13 | 18 | 25 |
| 3 | 6  | 11 | 16 | 23 |
| 2 | 10 | 15 | 19 | 24 |
| 5 | 9  | 14 | 20 | 22 |

## LESSON ACTIVITY

### Before Using the Page

• Write the following addition and subtraction exercises on the chalkboard. Note that no regrouping is necessary in some of them.

$$\begin{array}{r} 42 \\ + 25 \\ \hline \end{array} \quad \begin{array}{r} 39 \\ - 16 \\ \hline \end{array} \quad \begin{array}{r} 65 \\ + 25 \\ \hline \end{array} \quad \begin{array}{r} 43 \\ - 27 \\ \hline \end{array} \quad \begin{array}{r} 60 \\ - 13 \\ \hline \end{array} \quad \begin{array}{r} 26 \\ + 56 \\ \hline \end{array}$$

Use objects for grouping by tens and a chart and numeral cards as on page T233 to review the procedures for finding sums and differences. Then have the children copy and complete the exercises. Afterward, have the children explain the regrouping they used in both the addition and subtraction exercises.

### Using the Page

• Let the children work independently on this page. Remind them to watch the signs carefully so that they will know whether they are to add or subtract. Their performance on this page will help you to determine what reteaching, if any, is necessary.

• Have the children count the exercises on page 193. (Did any children count by fives since there are five exercises in each column?) Tell them that one-half of the exercises involve addition and see whether they can state how many that is without counting.

• After the children have completed the exercises, you may wish to ask questions similar to the following:

"How many answers are less than 15?" (two)

"How many answers are greater than 90?" (Note that there is one answer of 90, but no answer is greater than 90.)

"How many answers have a 3 in the tens' place?" (five)

"How many answers have a 0 in the ones' place?" (three)

"How many exercises did not require regrouping?" (six)



## OBJECTIVE

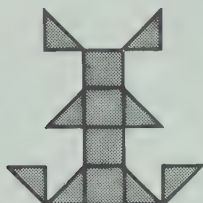
Demonstrate an understanding of concepts presented in this unit

## Materials

cards expressing numbers as tens and ones, copies of page T341, pictures made from gummed square shapes, geometric paper shapes to use as non-standard units of area, special work sheets for slides and turns

## RELATED ACTIVITIES

- Display pictures made from gummed square shapes, some of which contain halves of squares (cut along a diagonal). Have children state the number of square shapes used.



- Children may enjoy making border designs using cutouts of a shape. These can be pasted along a line as though the first shape is sliding to different positions along the line. The designs may be colored and then displayed.

Subtract.

$$\begin{array}{r} 24 \\ - 3 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 24 \\ - 4 \\ \hline 20 \end{array}$$

$$\begin{array}{r} 24 \\ - 5 \\ \hline 19 \end{array}$$

$$\begin{array}{r} 45 \\ - 4 \\ \hline 41 \end{array}$$

$$\begin{array}{r} 45 \\ - 5 \\ \hline 40 \end{array}$$

$$\begin{array}{r} 45 \\ - 6 \\ \hline 39 \end{array}$$

Regroup to show ten more ones.

5 tens

4 ones

9 tens

3 ones

4 tens

14 ones

8 tens

13 ones

Subtract.

$$\begin{array}{r} 56 \\ - 7 \\ \hline 56 \end{array}$$

$$\begin{array}{r} 74 \\ - 6 \\ \hline 74 \end{array}$$

$$\begin{array}{r} 25 \\ - 19 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 34 \\ - 35 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 67 \\ - 39 \\ \hline 39 \end{array}$$

$$\begin{array}{r} 34 \\ - 23 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 84 \\ - 38 \\ \hline 56 \end{array}$$

$$\begin{array}{r} 57 \\ - 29 \\ \hline 38 \end{array}$$

$$\begin{array}{r} 45 \\ - 17 \\ \hline 39 \end{array}$$

$$\begin{array}{r} 45 \\ - 27 \\ \hline 23 \end{array}$$

How many square units are inside each shape?

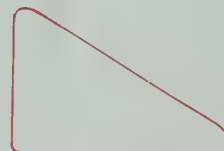


20



18

Slide the red shape to the right. Ring the shape it fits.

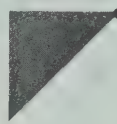


Can the red shape turn to fit the blue shape?



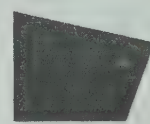
Yes

No



Yes

No



Yes

No

194 (one hundred ninety-four)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- Review the major concepts of this unit by using some of the preliminary activities for the pages. Other suggestions are given below.
- Pretend that five children planted seeds for a garden and that they counted the seeds planted by each child. Write on the chalkboard the information given. Ask who planted the most and who planted the fewest seeds. Then ask questions similar to the following and have children use addition or subtraction to find each answer.

|       |    |
|-------|----|
| Maria | 28 |
| Ann   | 66 |
| Bill  | 50 |
| Joe   | 85 |
| Alan  | 47 |

“Did Ann or Joe plant more seeds? How many more?”

“How many seeds were planted by Maria and Alan together?”

- Display cards that name tens and ones. Have children match the cards showing names for the same number; for example, 8 tens 6 ones and 7 tens 16 ones.

- Give each child a six-by-six section of page T341 and have them follow the lines to draw a shape. Have them count the squares enclosed and color the shape.
- Give each child an identical sheet of paper. Give some children rectangular units, some children triangular units, and other children square units to use to cover the sheet of paper. Have them count how many units were used and discuss the results. Have children suggest reasons why the answers differ.
- Prepare a work sheet showing pairs of several different geometric shapes. Have children draw lines to match the shapes the positions of which are related by a slide. For reviewing turns, prepare exercises similar to those shown on page 189.

### Using the Page

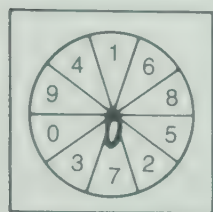
- Discuss with the children how they are to complete the exercises on this page. You may wish to provide pieces of tracing paper and pins for the exercises on slides and turns.

## Games and Activities

### Checkout (Game for page 178)

#### Materials

a spinner from page 119  
one set of numeral cards for 10 to 18  
a chart for 0 to 10 for each player



14

|    |   |
|----|---|
| 0  |   |
| 1  |   |
| 2  |   |
| 3  |   |
| 4  |   |
| 5  |   |
| 6  |   |
| 7  | ✓ |
| 8  |   |
| 9  |   |
| 10 |   |

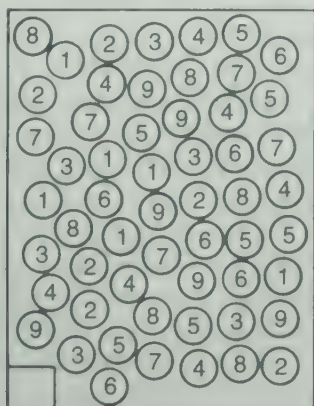
#### Rules

1. The numeral cards are shuffled and placed face down in a pile.
2. The card on the top of the pile is turned face up to form another pile.
3. Each player spins the spinner, subtracts the number obtained from the number shown on the card, and indicates the answer on her/his chart.
4. Then another player turns the next card face up and repeats the steps.
5. When all the cards in the first pile have been moved to the second pile, the second pile is turned face down and becomes the drawing pile.
6. The aim of the game is for each player to check as many numbers on the chart as possible in 11 turns.
7. After the last turn, each player finds the sum of the numbers that are not checked on her/his chart. The player having the least sum is the winner.

### Activity for page 181

Prepare a work sheet as shown for each child. Select a number, for example, 15. Have the children write the numeral in the box in the lower left corner of the work sheet. Then have the children color as many pairs of addends as possible having a sum of 15, for example, 9 and 6, 8 and 7. The circles for each pair of addends are joined by a line. Then a crayon of another color is used to indicate sets of three addends having a sum of 15. These are also joined by lines.

Children may use other colors to indicate four addends and five addends for sums of 15.



### Corner Store (Game for page 187)

#### Materials

a game board showing the prices of items  
a marker for each player  
one regular die  
a set of "limit" cards naming amounts of money such as 78¢, 83¢, 90¢, and 94¢  
paper and pencil for each player

|       |  |          |          |  |                  |
|-------|--|----------|----------|--|------------------|
|       |  |          |          |  | Earn 14¢         |
|       |  |          |          |  |                  |
|       |  | Earn 10¢ |          |  |                  |
|       |  |          | Earn 10¢ |  | Find your total. |
| Start |  |          |          |  |                  |

#### Rules

1. The "limit" cards are shuffled and each player draws one card. The amount named on the card indicates the total amount of money a player may "spend" during the game.
2. Markers are placed on START. Each player, in turn, tosses the die and advances her/his marker the number of spaces indicated by the die.
3. If the space occupied by a marker indicates an item for sale, the player may "purchase" the item. The price shown is copied onto a piece of paper.
4. The player who, at the completion of the game, comes closest to spending the amount indicated on her/his limit card, without exceeding that limit, wins the game.

### Activities for page 188

1. Have children start at a red square on a checkerboard and slide a checker up to a red square, down to a black square, right to a black square, and so on, making certain that the checker is never turned to face a new direction. You may also wish to have children slide the checker diagonally.
2. Give each child a work sheet marked to show eight rows of eight squares like a checkerboard. Have the children write the numerals from 1 to 64 in the squares as shown.

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
| 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |

Have the children follow instructions similar to these:  
"Start at the square for 58. Using two slides move a checker to 30." (One child may slide the checker up to 26 and then slide it to the right to 30. Another child may slide the checker to the right to 62 and then slide it up to 30.) "Now start at the square for 58 and use only one slide to move the checker to 30."



## Unit 10 Overview

In this unit, numeration is extended to three-place numerals with emphasis on the place-value names of the three digits. Exercises are provided for the interpretation of numerals, for the writing of numerals, and for the ordering of three-digit numbers to 999. Practice in addition and subtraction of two-digit numbers is carried forward from the lessons of earlier units, and addition is used to check the accuracy of subtraction. The solving of problems requires the skills of subtraction with regrouping. Counting by fives to 60 precedes telling and recording time at five-minute marks. Work with money involves the notation for amounts to \$1.99. Finding the distance around a shape by adding measurements expressed in centimetres provides an easy introduction to the concept of perimeter, although the term itself is not used in this book. An on-going activity is presented in the first lesson in which the children are to record daily temperatures on a vertical bar graph. The third type of transformation is presented in this unit, namely the *flip*. After identifying flips, the children review *line symmetry*, which is very closely related. The last lesson provides a *Checkup* of the skills and concepts presented in this unit and a further assessment of children's abilities in addition and subtraction of two-digit numbers.

### Unit Outcomes

#### Number

- add and subtract two-digit numbers, no regrouping and regrouping, sums and minuends to 99
- use addition to check subtraction
- solve problems involving subtraction, regrouping, minuends to 99
- count by fives
- complete tables involving counting by fives
- identify a set of hundreds, a set of tens, and a set of ones and write the corresponding three-place numeral, numbers from 200 to 999
- interpret three-place numerals as hundreds, tens, and ones
- order the numbers to 999

#### Measurement

- record temperatures on a graph
- count units of length to find the distance around a shape
- measure the sides of a plane shape and then calculate the distance around the shape
- tell and record time at five-minute marks
- write amounts of money from one dollar to one dollar and ninety-nine cents using dollars-and-cents notation
- interpret dollars-and-cents notation

#### Geometry

- identify flips
- complete shapes to show line symmetry

#### Background

**Number:** The inverse relationship between addition and subtraction is useful in several ways: to relate basic facts of the two operations; to solve for an unknown number in an open number sentence; to check the accuracy in computation. In the last case, the result of subtraction can be checked by adding the difference and the number that was subtracted, as shown.

$$25 - 13 = 12$$

$$12 + 13 = 25$$

If the sum obtained by this procedure is not the same as the minuend of the subtraction exercise, it is obvious that an error has been made in either of the operations. Exercises that involve regrouping emphasize the inverse relationship of the two operations when they are written in vertical form. In subtraction, one ten is renamed as ten ones, and in addition, ten ones are renamed as one ten.

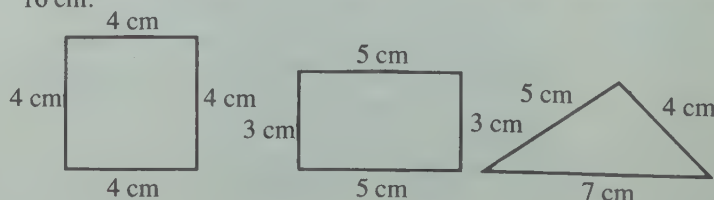
$$\begin{array}{r} 2 \ 12 \\ - 17 \\ \hline 15 \end{array} \qquad \begin{array}{r} 1 \\ 15 \\ + 17 \\ \hline 32 \end{array}$$

Most children will be able to count by fives, but it is important to review the concepts and skills because telling time at five-minute marks is also presented in this unit. For telling time, the upper limit for counting by fives may be set at 60, but this may be extended to 100 without increasing the difficulty very much. The alternate pattern of 5 and 0 in the ones' place of multiples of five provides an interesting insight into the consistency of our system of numeration. This can be seen clearly on a hundred chart in which all the 5's and 0's appear in columns. Children can also acquire incidentally the information that two fives equal one ten, four fives equal two tens or twenty, and so on.

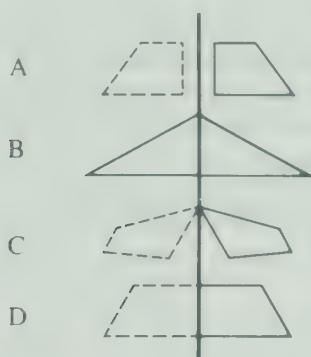
Three-place numerals were first introduced in Unit 7 and a rereading of the background in the overview of Unit 7 may be advisable in order to plan a review of the basic features that deserve emphasis. It should be obvious to children that 9 is the greatest number that can be represented in any one place, and that 99 is the greatest two-digit number and 999 is the greatest three-digit number.

**Measurement:** The decimal nature of our monetary system requires the use of a decimal point whenever amounts in cents are expressed in terms of the dollar. At this stage of their mathematical understanding it is sufficient that children merely accept the fact that a dot is written between the digits for dollars and the digits for cents and that there must be two digits to the right of the dot. The latter point is significant in cases where the number of cents is less than ten, for example, one dollar and nine cents. The numeral \$1.9 is incorrect although the 1 is on the dollars' side of the dot and the 9 is on the cents' side. Since there must be two digits to represent cents, a zero must first be written to the right of the dot, making \$1.09 the correct numeral.

In finding the distance around a shape (the perimeter) it does not matter which point of the boundary is chosen as a starting point—the distance around is always the same. The activities in measurement, therefore, can also be used to review and emphasize the associative (grouping) property of addition, which states that the order of grouping the addends does not alter their sum. The children will be surprised and impressed that different shapes can have the same perimeter. For example, each of the three shapes having the dimensions shown has a perimeter of 16 cm.



**Geometry:** A shape can be flipped about a line that may be outside the shape (A), inside the shape (B), or a part of the shape (C and D). A flip (reflection) may be better understood by considering how a mirror affects the image of an object, or by imagining what happens when any object is flipped over.



The two topics of flip image and line symmetry are presented in succession in this unit because they tend to support each other. Flipping a shape about a line produces a symmetrical shape and the line is the *axis of symmetry*. On a geoboard it can be seen that for every point of a symmetrical shape on one side of a line of symmetry there is a corresponding point on the other side and at the same distance from the line. The focus here, as it was with the slide and the turn, is on the action involved and not on a formal development of the concept.

### Teaching Strategies

The children may continue to use objects for grouping and place-value charts for addition and subtraction of two-digit numbers with regrouping as long as they need them to understand the operations. Similarly, writing the extra ten above the tens' column in addition exercises and writing the minuend with one ten expressed as ten ones in subtraction exercises may also be continued as long as necessary. Children who can think of the required changes without writing them should be encouraged to do so.

For telling time at five-minute marks, an extra set of numerals showing multiples of five to 60 can be placed around the dial of a demonstration clock, as shown at the top of page 204. The children should learn to associate the number of minutes with the numerals 1 to 12 on the regular dial. Some of the numerals might later be removed, leaving only a few (15, 30, 45) as referents from which others could be quickly determined.

A digital clock is helpful in showing how to record time with a colon (:) between the numerals for the hours and the minutes. Make the children aware that for less than ten minutes past an hour, a zero is written to the right of the colon. For example, "five minutes past four" is shown as 4:05. Social customs are not always mathematically correct and in cases of this kind, the zero is incorrectly named as the letter O. The time is read "four-o-five". This parallels the use of zero in dollars-and-cents notation; for example, a price of \$1.05 might be read colloquially as "one-o-five" as well as "one dollar and five cents".

Finding the distance around a shape provides experience in measuring in centimetres and in adding the measures. In connection with the preliminary activities on page T259, take care in drawing the triangles on the chalkboard so that the sum of the lengths of the three sides is not greater than 99.

Because the geometric topics of flips and line symmetry are not dependent on number concepts and skills, this provides an opportunity to form new groups in which children having different abilities work together. The supply of geoboards and cutouts for tracing and flipping shapes will also influence the size of the groups. Activities involving the use of folded paper to show line symmetry may be extended to art activities. Cutting folded paper along the open edges produces simple symmetrical shapes. More interesting symmetrical shapes can be created by pressing a blob of paint between the two parts of a folded piece of paper. In either case, the line of symmetry is easily identified as the crease.

### Materials

demonstration thermometer, outdoor thermometer  
a large copy of the graph on page 195  
place-value pocket chart, abacus  
string or yarn, various objects for measuring the distance around  
centimetre rulers, metre sticks  
a copy of page T344 for each child  
a copy of page T335 for each child  
flip charts, materials for each child to extend her/his flip chart to show the hundreds' place  
demonstration number line  
boxes of small objects for counting by fives to 100  
demonstration clock, a paper-plate clock face for each child  
a work sheet showing a large circle divided into 60 equal parts  
models for hundreds, tens, and ones  
pocket chart for numeral cards, three cards for each of the numerals 1 to 9 and two cards for 0  
real money, play money, or cutouts from copies of pages T327 and T328  
cards showing amounts of money from \$1.00 to \$1.99  
pictures showing a one-dollar bill and coins for amounts to \$1.99  
pairs of cards showing two numerals for an amount of money from \$1.01 to \$1.99  
cutouts of shapes, numerals, and letters from page T241  
shapes for illustrating flips, pins, shapes from copies of page T346  
straight edges, geoboards and rubber bands  
copies of page T341 or T342 for geopaper  
overhead projector

### Vocabulary

|             |           |
|-------------|-----------|
| minutes     | hour hand |
| minute hand | flip      |



## Unit 10 Theme – Prehistoric Life

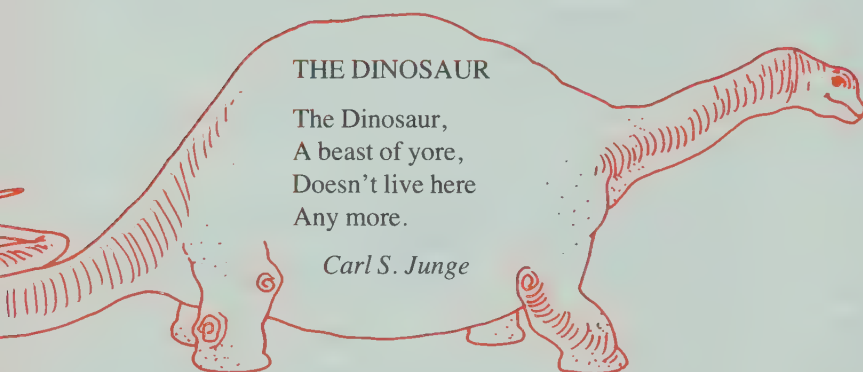
The purpose of this theme is to capitalize on the fascination that dinosaurs have for young children and extend their knowledge of these mysterious monsters of the past. It is hoped that the children will realize the information is gained from scientific calculation, and there is much we still do not know about these reptiles. It is also hoped that the children will appreciate the variety and the massive size of the dinosaurs and also the individual characteristics of each kind.

Provide books on prehistoric life for the children to use for reference. Display pictures of various kinds of dinosaurs. Plastic scale models are available and are useful for understanding relative sizes of the dinosaurs.

### LANGUAGE ACTIVITIES

#### 1. Reading About Dinosaurs

Display the following poem on a sheet of chart paper.



Read the poem and, if necessary, explain the meanings of “beast” and “yore”. Ask the children for their ideas on why dinosaurs do not live here any more. Note that this poem is adapted for the exercises involving a code on pages 214 and 215.

Explain that the word *dinosaur* comes from two Greek words that mean “terrible lizard”. Because some of the first dinosaurs that scientists discovered were fierce meat eaters, they were given this name. Not all dinosaurs were terrible or fierce. Some were quite gentle and timid.

Plan to read about dinosaurs each day so that the children can extend their knowledge and gain new vocabulary. After reading from a book, place it in the reading centre for the children to read or to use as a reference book. A suitable book to begin with is *Giant Dinosaurs* by Erna Rowe, published by Scholastic Book Services in 1975.

#### 2. Dinosaur Names

Each day as you read to the children about dinosaurs, record the names of the ones you meet. Some of the more popular dinosaurs are the following:

|                      |                      |                       |
|----------------------|----------------------|-----------------------|
| <i>Camptosaurus</i>  | <i>Ankylosaurus</i>  | <i>Tyrannosaurus</i>  |
| <i>Brontosaurus</i>  | <i>Brachiosaurus</i> | <i>Corythosaurus</i>  |
| <i>Allosaurus</i>    | <i>Stegosaurus</i>   | <i>Psittacosaurus</i> |
| <i>Styracosaurus</i> | <i>Monoclonius</i>   | <i>Diplodocus</i>     |
| <i>Protoceratops</i> | <i>Triceratops</i>   | <i>Iguanodon</i>      |

Have the children complete some of the following activities using the dinosaur names from the list.

- Name the dinosaur shown in a picture and state eight words that describe it.
- Make words using only the letters in a dinosaur name.
- Mark the vowels in dinosaur names.
- Match the dinosaur names with plastic models or pictures.
- Put the dinosaur names in alphabetical order.

#### 3. Dinosaur Riddles

Read the following poem to the children.

##### PACHYCEPHALOSAURUS

Among the later dinosaurs

Though not the largest, strongest,  
*Pachycephalosaurus* had  
The name that was the longest.

Yet he had more than syllables,  
As you may well suppose.  
He had great knobs upon his cheeks  
And spikes upon his nose.

Ten inches thick, atop his head,  
A bump of bone projected.  
By this his brain, though hardly worth  
Protecting, was protected.

No claw or tooth, no tree that fell  
Upon his head kerwhacky,  
Could crack or crease or jar or scar  
That stony part of Paky.

And so he nibbled plants in peace  
And lived untroubled days.  
Sometimes, in fact, as Paky proved,  
To be a bonehead pays.

Richard Armour

Discuss why this dinosaur was particularly interesting. The first and the third verses will give the children some clues. Other dinosaurs also had characteristics that made them notable. Display these riddles to encourage the children to read and develop research skills.

- Which dinosaur had the most teeth? (*Trachodon*)
- Which was the heaviest dinosaur? (*Brachiosaurus*)
- Which was the longest dinosaur? (*Diplodocus*)
- Which dinosaur had a large tube of hollow bone that grew out of the back of its head? (*Parasaurolophus*)
- Which was the largest meat-eating dinosaur? (*Tyrannosaurus*)
- Which dinosaur had the longest name? (*Pachycephalosaurus*)
- What does the name *Monoclonius* mean? (single horn)
- Which was the biggest dinosaur with large horns on its head? (*Triceratops*)
- Which dinosaur had a tail with spikes? (*Stegosaurus*)
- Which dinosaur had a bony knob on the end of its tail? (*Ankylosaurus*)
- Which was one of the largest plant-eating dinosaurs? (*Brontosaurus*)

#### 4. Word Activities

Collect words that are suggested by the topic of prehistoric life. The following words were suggested by one class:

|         |          |          |
|---------|----------|----------|
| giant   | museum   | reptile  |
| swamp   | attack   | monsters |
| fierce  | spikes   | leaves   |
| horns   | bones    | plants   |
| protect | skeleton | meat     |

After about twenty words have been collected, have the children

- read the words to reinforce sight vocabulary;
- put the words in alphabetical order;
- list the words by the number of syllables;
- order the words by the number of letters;
- sort and classify the words.

#### 5. Writing a Book

After you have read and discussed many books on dinosaurs, have the children classify the information they have learned about dinosaurs. Consider the following categories:

|               |              |
|---------------|--------------|
| appearance    | protection   |
| eating habits | reproduction |
| habitat       | temperament  |

Have each child select a favorite dinosaur. On each of five days, have the children prepare a page on one of the topics listed. Encourage the children to illustrate each page. After the children have made a suitable cover, the pages may be assembled into a book for the reading centre.

#### 6. Dinosaur Rhymes

As the children become more familiar with the names of dinosaurs and their characteristic features, encourage them to compose funny rhymes about the dinosaurs. Some examples are given to set the mood for the children.

*Diplodocus, Diplodocus,*  
With such a neck to bathe  
What other dinosaur  
Acted as your slave?

*Trachodon, Trachodon,*  
Oh, what a great mistake!  
With two thousand teeth to chew upon  
You never tasted steak.

*Triceratops, Triceratops,*  
With a horn upon your nose  
And two horns above your eyes  
Any creature that would chase you  
Wasn't very wise.

*Tyrannosaurus, Tyrannosaurus,*  
The fiercest of them all.  
Did you mutter—did you moan  
Did you grumble—did you groan  
When you ate Aunt *Allosaurus*?

#### MATHEMATICS ACTIVITIES

##### 1. Sizes of Dinosaurs

Use dinosaur models or pictures for this activity. Using the information obtained about dinosaurs, place the models or pictures in order from the longest to the shortest dinosaur. Then

place the dinosaurs in order from tallest to shortest. Discuss which dinosaurs changed places.

Cut strips of paper 10 cm wide. Join the strips together in the hall, and mark off the length of the *Brontosaurus*, *Tyrannosaurus*, and *Diplodocus* in metres. Mount the strips on the wall to represent the lengths of the three kinds of dinosaurs. The strips will be in the proportions shown.

*Brontosaurus*

*Tyrannosaurus*

*Diplodocus*

In order to assist the children in relating to these lengths, have them complete the following chart:

| Dinosaur             | Length in |      |       |
|----------------------|-----------|------|-------|
|                      | steps     | hops | jumps |
| <i>Brontosaurus</i>  |           |      |       |
| <i>Tyrannosaurus</i> |           |      |       |
| <i>Diplodocus</i>    |           |      |       |

#### SCIENCE ACTIVITIES

##### 1. How We Find Out About Dinosaurs

Because the last of the dinosaurs died more than sixty million years ago, no one has ever seen a dinosaur, yet we have a great deal of information about their habits and appearance. Explain to the children how scientists can read information from rocks.

Traces of plant and animal life found in rocks are called *fossils*. Shells, bones, teeth, and plants are common fossils. Rocks are formed in layers and each layer tells the scientists about a different period in time. Some of the dinosaur bones found in the lowest layers have turned to stone or become petrified. Scientists have also found dinosaur footprints, some of which are more than a metre long. Petrified dinosaur eggs have also been discovered—quite unusual fossils.

Scientists carefully dig the dinosaur bones from rock, using shovels, picks, and hammers. The bones are sorted and fastened together to construct a skeleton. From the dinosaur's skeleton, the scientists can find out such things as how large the dinosaur was, how it moved, what it ate, and how big its brain was.

There are still many things we do not know about dinosaurs, but new fossils are still being discovered.

##### 2. Making Fossils

One of the most unusual finds in the search for dinosaurs was the discovery of a duck-billed dinosaur with the fine details of its skin preserved in stone.

To give the children an appreciation of how fine details can be preserved, make some leaf fossils in the classroom. Choose some leaves that have quite pronounced veins. Press a piece of Plasticine flat and make it large enough to form a bed for one of the leaves. Form a ring of cardboard large enough to encircle the leaf. Press one edge of the ring of cardboard into the Plasticine. Place the leaf to lie flat inside the ring.

Mix some plaster of Paris according to the directions on the package and pour it over the leaf. Let the plaster of Paris set



until it becomes quite hard. Then tear off the ring of cardboard and remove the Plasticine. Pull the leaf gently away from the hardened plaster. Let the children study and describe the detail in the plaster “fossil”.

### 3. Classifying Dinosaurs

From the information obtained by scientists, we know that dinosaurs can be grouped in different ways.

Record the characteristics of the meat-eating and the plant-eating dinosaurs. List the dinosaurs that belong to each group.

Some dinosaurs spent all their time on land, whereas others spent much of their time in water. It is thought that the water helped to support their massive bodies. List the dinosaurs that belong to each group.

Some dinosaurs had plates or spikes to protect their bodies, whereas others had smooth coverings. List the dinosaurs that belong to each group.

## SOCIAL STUDIES ACTIVITIES

### 1. Dinosaurs in Canada

Discuss with the children the locations in Canada where bones and footprints of dinosaurs have been found (Peace River District of British Columbia, Alberta, Saskatchewan, Bathurst Island in the Northwest Territories, and Nova Scotia). Mark these “dinosaur settlements” on an outline map of Canada. Discuss whether dinosaurs might have lived in other parts of Canada. If so, discuss why no evidence of them has been found. Ask whether dinosaurs could live in Canada today. Discuss the climatic conditions that must have existed in “Canada” at the time of the dinosaurs and why dinosaurs needed those conditions to live.

### 2. Dinosaur Secrets

In their reading the children will have learned of many things we know about dinosaurs. However, there are things we will never know about dinosaurs. Have the children suggest and discuss some of the things that we will never know; for example,

- what color the dinosaurs were;
- how long it took for a dinosaur’s eggs to hatch;
- how long it took for a dinosaur to grow to maturity;
- how long a dinosaur lived;
- why so few fossils of young dinosaurs have been found;
- whether dinosaurs made any sounds.

### 3. Why Did the Dinosaurs Die?

Since 1818 when the finding of the first dinosaur fossil was recorded in Connecticut, there have been many theories about why the dinosaurs disappeared. Ask the children to tell of some of the theories they have read as to why dinosaurs became extinct. Two of these theories are as follows:

- The climate changed and conditions became too cool for the dinosaurs who were used to hot conditions.
- As warm-blooded mammals began to appear on Earth, they ate the dinosaur eggs.

One of the most recent theories was discussed at a meeting in Ottawa during May, 1981. This latest theory is that a body from outer space, like a comet, suddenly collided with Earth, causing such a severe dust storm that the sun was blotted out for several years. When there was no sun, the plants died. The dinosaurs that depended on plants for food simply died of starvation.

Have the children investigate whether there have been further developments in this latest theory.

## ART ACTIVITIES

### 1. Dinosaur Silhouettes

Discuss the colors that can be described as warm colors (red, orange, and yellow). Make up a thin solution of paint of each color and provide the children with sponges. Have them cover a large sheet of Manila paper with three bands of color in the order of red, orange, and yellow. The colors of the outer bands should blend into the middle band. This will be the background for silhouettes of dinosaurs.

Have each child draw the outline of a dinosaur on newsprint and then trace this pattern on black construction paper. The silhouette can then be cut out and mounted on the bright background.

### 2. Wall Hangings

Draw the outline of a dinosaur on newsprint. Trace this pattern onto a piece of felt and cut out the shape. Glue the dinosaur to a fabric background. Trees or strips of grass can be included. Glue this wall hanging to a dowel of suitable length.

### 3. Stuffed Dinosaurs

Using their dinosaur patterns, have the children cut two matching shapes from felt. Have them use embroidery needles to stitch the pieces together with yarn, using a whipstitch or a short running stitch. Leave an opening and stuff the dinosaur with chips of foam or small scraps of fabric. Close the opening securely. Each child will have a cuddly new friend.

### 4. Dinosaur Display

If the children are very enthusiastic about dinosaurs, they may be interested in making a tabletop display of “real” dinosaurs from papier-mâché. Very clear, step-by-step instructions with diagrams are given in *How to Make a Dinosaur* by Sigmund Kalina, published by Lothrop, Lee & Shepard Co. in 1976. Patterns are given for making a *Stegosaurus*, a *Brontosaurus*, and a *Tyrannosaurus*.

## MOVEMENT ACTIVITIES

### 1. Dinosaur Relay

Form teams with four to six players in each team. Have each team line up in single file at a starting line. Each team chooses a particular dinosaur whose method of movement is to be imitated. For example, the movement of a *Brachiosaurus* would be lumbering along on all fours; the movement of a *Tyrannosaurus* would be running fast with the hands folded up against the chest; the movement of an *Ornitholestes* would be running very fast with each arm bent at the elbow and the forearms pointing upward.

The first member of each team imitates the predetermined dinosaur for that team as he/she runs to the finishing line and returns, touching the next “dinosaur” in that team. The second member of the team repeats the procedure. The team that finishes first is the winner.

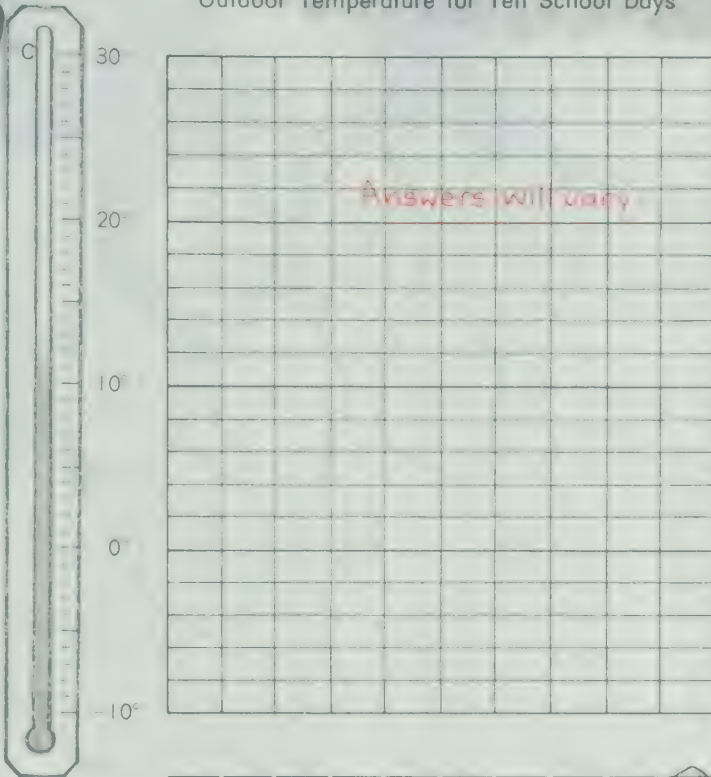
## MUSIC ACTIVITIES

### 1. Dinosaur Chant

Encourage the children to string the names of dinosaurs in sequence to make up chants and rhymes. For example, by saying the names *Allosaurus*, *Brontosaurus*, *Camptosaurus*, and so on, the children can create a chant for, say, skipping rope.

## Unit 10

Record the outdoor temperature for ten school days.  
Outdoor Temperature for Ten School Days



School Days from \_\_\_\_\_ to \_\_\_\_\_

Which day was the warmest? \_\_\_\_\_

Which day was the coolest? \_\_\_\_\_

What was the temperature on the sixth day? \_\_\_\_\_

Was it warmer on the second day or on the ninth day? \_\_\_\_\_

Was it cooler on the fifth day or on the seventh day? \_\_\_\_\_

Recording temperatures on a graph

(one hundred ninety-five) 195

## LESSON OUTCOME

Record temperatures on a graph

## Materials

demonstration thermometer, outdoor thermometer, a large copy of the graph on page 195

## RELATED ACTIVITIES

- Have children measure the outdoor temperature at hourly intervals from 9:00 a.m. to 3:00 p.m. on a given day and graph these, noting the changes in temperature.

## LESSON ACTIVITY

## Before Using the Page

- Use the demonstration thermometer prepared for page 65 and review how the red line moves as the temperature becomes warmer and how it moves when the temperature becomes colder.

Show different temperatures and have children read them; for example,  $18^{\circ}\text{C}$  is read "eighteen degrees Celsius". State different temperatures and have children show these on the thermometer. Remind them of the significance of the temperature  $0^{\circ}\text{C}$ .

- Prepare a large copy of the graph shown on page 195. Point out that only some of the numbers are shown for the scale of the thermometer. Have children read each temperature for which the number is shown on the scale and trace along the corresponding line of the graph. You may wish to include the numbers for the five-degree intervals on the scale.

Have children, in turn, select a horizontal line of the graph and trace the line to the left toward the thermometer to find the corresponding mark on the scale. Then have them identify what number corresponds to that mark on the scale.

Have a child find the mark on the scale for two degrees above zero. Ask the children how high they would color a bar of the graph to show a temperature of two degrees above zero. Repeat for  $4^{\circ}\text{C}$ ,  $6^{\circ}\text{C}$ ,  $12^{\circ}\text{C}$ , and so on.

- Have a child read the temperature on the outdoor thermometer and write it on the chalkboard. Then have the children help to determine how high to color the bar to show today's outdoor temperature on the large copy of the graph. Complete the coloring and have children help to show the date below the bar.

## Using the Page

- The work on page 195 involves ten consecutive school days. The temperature on the outdoor thermometer is read at the same time each day and recorded on the graph. You may wish to have the children show the numerals  $-5^{\circ}$ ,  $5^{\circ}$ ,  $15^{\circ}$ , and  $25^{\circ}$  at the appropriate marks on the scale. Have the children answer the questions at the bottom of the page after the graph has been completed. You may wish to have the children complete the large graph before assigning the page. As an alternative, have the children show the temperature on their own graphs each day after the large graph has been marked for that day.



## OBJECTIVE

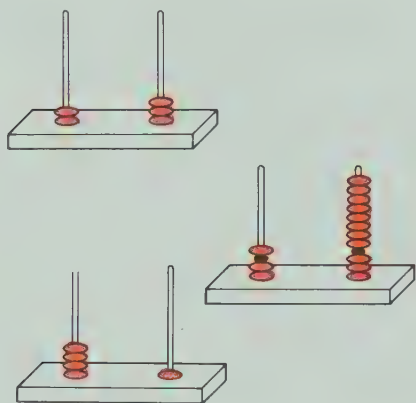
Add two-digit numbers, no regrouping and regrouping, sums to 99

## Materials

place-value pocket chart

## RELATED ACTIVITIES

- Use the abacus (See page xxxi.) for finding the sum of two-digit numbers without regrouping. Then show the children how to use the abacus for finding the sum of two-digit numbers with regrouping. The diagrams show the three steps for adding 23 and 18.



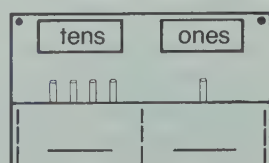
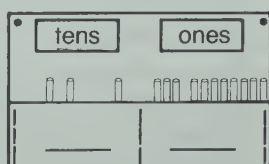
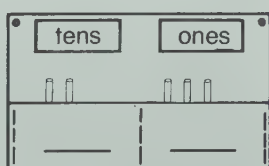
- Prepare work sheets of exercises similar to the following to help reinforce the concept of adding two-digit numbers with regrouping. Have the children determine what digit is missing in each exercise.

$$\begin{array}{r} 36 \\ + \square 5 \\ \hline 61 \end{array} \quad \begin{array}{r} 41 \\ + \square 1 \\ \hline 60 \end{array}$$

## LESSON ACTIVITY

### Before Using the Page

- Use the place-value pocket chart to review addition of two-digit numbers, first for exercises without regrouping and then for exercises with regrouping. The diagrams show the three steps for adding 23 and 18.
- You may wish to encourage some of the children to discontinue the practice of writing a 1 above the tens' column as they gain confidence in renaming ten ones as one ten. It is wiser, however, to allow children to write this 1 as long as they need to, rather than to insist that they drop it before they are ready.



Add.



|   |  |  |  |  |
|---|--|--|--|--|
| $\begin{array}{r} 88 \\ + 3 \\ \hline 91 \end{array}$ | $\begin{array}{r} 69 \\ + 23 \\ \hline 92 \end{array}$ | $\begin{array}{r} 24 \\ + 37 \\ \hline 61 \end{array}$ | $\begin{array}{r} 49 \\ + 24 \\ \hline 73 \end{array}$ | $\begin{array}{r} 77 \\ + 16 \\ \hline 93 \end{array}$ |
| $\begin{array}{r} 64 \\ + 9 \\ \hline 73 \end{array}$ | $\begin{array}{r} 69 \\ + 15 \\ \hline 84 \end{array}$ | $\begin{array}{r} 56 \\ + 16 \\ \hline 72 \end{array}$ | $\begin{array}{r} 23 \\ + 28 \\ \hline 51 \end{array}$ | $\begin{array}{r} 37 \\ + 28 \\ \hline 65 \end{array}$ |

196 (one hundred ninety-six)

Addition practice: sums to 99

### Using the Page

- Let the children work independently while you help those who are having difficulty. Note that the exercises in the first three rows require no regrouping, whereas those in the last three rows require regrouping. You may wish to have the children complete the exercises by columns rather than by rows.
- After the children have completed all the addition exercises on the page, you may wish to have them color green the leaves that show sums less than 75, color yellow the leaves that show sums greater than 75, and color brown the leaves that show sums of 75.

**OBJECTIVE**

Subtract two-digit numbers, no regrouping and regrouping, minuends to 99

**Materials**

place-value pocket chart, abacus

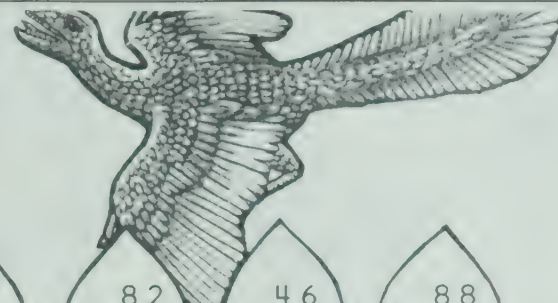
**RELATED ACTIVITIES**

- Prepare work sheets of number charts showing patterns, similar to those below, to provide the children with more practice in subtraction.

| –  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----|---|---|---|---|---|---|---|---|---|
| 10 |   |   |   |   |   |   |   |   |   |
| 11 |   |   |   |   |   |   |   |   |   |
| 18 |   |   |   |   |   |   |   |   |   |

| –  | 6 | 16 | 26 | 36 | 46 | 56 |
|----|---|----|----|----|----|----|
| 64 |   |    |    |    |    |    |
| 74 |   |    |    |    |    |    |
| 84 |   |    |    |    |    |    |
| 94 |   |    |    |    |    |    |

Subtract.



$$\begin{array}{r} 35 \\ -13 \\ \hline 22 \end{array}$$

$$\begin{array}{r} 67 \\ -51 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 82 \\ -42 \\ \hline 40 \end{array}$$

$$\begin{array}{r} 46 \\ -46 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 88 \\ -53 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 96 \\ -31 \\ \hline 65 \end{array}$$

$$\begin{array}{r} 54 \\ -10 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 75 \\ -43 \\ \hline 32 \end{array}$$

$$\begin{array}{r} 68 \\ -24 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 37 \\ -6 \\ \hline 31 \end{array}$$

$$\begin{array}{r} 83 \\ -73 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 86 \\ -14 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 47 \\ -35 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 68 \\ -3 \\ \hline 65 \end{array}$$

$$\begin{array}{r} 99 \\ -64 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 71 \\ -37 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 21 \\ -15 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 41 \\ -29 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 76 \\ -46 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 71 \\ -28 \\ \hline 56 \end{array}$$

$$\begin{array}{r} 69 \\ -24 \\ \hline 45 \end{array}$$

$$\begin{array}{r} 812 \\ 92 \\ -86 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 96 \\ -26 \\ \hline 70 \end{array}$$

$$\begin{array}{r} 313 \\ 43 \\ -27 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 510 \\ 60 \\ -52 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 514 \\ 64 \\ -45 \\ \hline 19 \end{array}$$

$$\begin{array}{r} 714 \\ 84 \\ -57 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 815 \\ 95 \\ -69 \\ \hline 26 \end{array}$$

$$\begin{array}{r} 415 \\ 55 \\ -37 \\ \hline 18 \end{array}$$

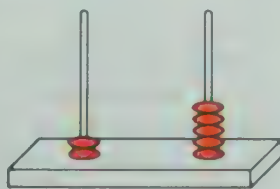
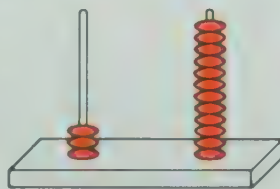
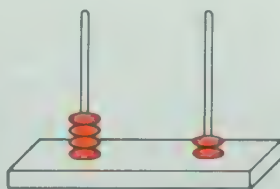
$$\begin{array}{r} 813 \\ 93 \\ -68 \\ \hline 25 \end{array}$$

Subtraction practice minuends to 99

(one hundred ninety-seven) 197

**LESSON ACTIVITY****Before Using the Page**

- Use the place-value pocket chart or the abacus to review subtraction of two-digit numbers, first for exercises without regrouping and then for exercises with regrouping. The diagrams show the three steps for subtracting 17 from 42 on the abacus.
- Write exercises on the chalkboard for the children to copy and complete. The place-value pocket chart or the abacus may be used to check work shown on the chalkboard. You may wish to ask a child to choose either device for checking another child's work.



- Children have been showing the renaming of one ten as ten ones by writing the numerals above the appropriate columns. This practice should be continued by children who have difficulty. Children who can work accurately without using the extra numerals should be encouraged to discontinue the practice.

**Using the Page**

- Let the children work independently while you help those who are having difficulty. The exercises in the first three rows do not require regrouping, whereas those in the last three rows require regrouping. You may wish to have the children complete the exercises by columns rather than by rows.
- After the children have completed all the subtraction exercises on the page, you may wish to have them color green the leaves that show differences less than 30, color yellow the leaves that show differences greater than 30, and color brown the leaves that show differences of 30.



# LESSON OUTCOME

Use addition to check subtraction

## RELATED ACTIVITIES

- You may wish to have the children work in pairs, one doing subtraction and the other checking it by addition. The children should change roles so that each child has practice with both operations.

Check

$$\begin{array}{r} 58 \\ -13 \\ \hline 45 \end{array} \quad \begin{array}{r} 45 \\ +13 \\ \hline 58 \end{array}$$

Check

$$\begin{array}{r} 50 \\ -25 \\ \hline 25 \end{array} \quad \begin{array}{r} 25 \\ +25 \\ \hline 50 \end{array}$$

Subtract. Then add to check.

|  |  |  |
|--|--|--|
| $\begin{array}{r} 68 \\ -12 \\ \hline 56 \end{array} \quad \begin{array}{r} 56 \\ +12 \\ \hline 68 \end{array}$  | $\begin{array}{r} 610 \\ -54 \\ \hline 16 \end{array} \quad \begin{array}{r} 16 \\ +54 \\ \hline 70 \end{array}$ | $\begin{array}{r} 713 \\ -19 \\ \hline 64 \end{array} \quad \begin{array}{r} 64 \\ +19 \\ \hline 83 \end{array}$ |
| $\begin{array}{r} 811 \\ -36 \\ \hline 55 \end{array} \quad \begin{array}{r} 55 \\ +36 \\ \hline 91 \end{array}$ | $\begin{array}{r} 413 \\ -25 \\ \hline 28 \end{array} \quad \begin{array}{r} 28 \\ +25 \\ \hline 53 \end{array}$ | $\begin{array}{r} 315 \\ -18 \\ \hline 27 \end{array} \quad \begin{array}{r} 27 \\ +18 \\ \hline 45 \end{array}$ |
| $\begin{array}{r} 612 \\ -15 \\ \hline 57 \end{array} \quad \begin{array}{r} 57 \\ +15 \\ \hline 72 \end{array}$ | $\begin{array}{r} 87 \\ -62 \\ \hline 25 \end{array} \quad \begin{array}{r} 25 \\ +62 \\ \hline 87 \end{array}$  | $\begin{array}{r} 818 \\ -79 \\ \hline 19 \end{array} \quad \begin{array}{r} 19 \\ +79 \\ \hline 98 \end{array}$ |
| $\begin{array}{r} 511 \\ -34 \\ \hline 27 \end{array} \quad \begin{array}{r} 27 \\ +34 \\ \hline 61 \end{array}$ | $\begin{array}{r} 616 \\ -68 \\ \hline 8 \end{array} \quad \begin{array}{r} 8 \\ +68 \\ \hline 76 \end{array}$   | $\begin{array}{r} 812 \\ -18 \\ \hline 74 \end{array} \quad \begin{array}{r} 74 \\ +18 \\ \hline 92 \end{array}$ |

198 (one hundred ninety-eight)
Using addition to check subtraction

## LESSON ACTIVITY

### Before Using the Page

- Write exercises on the chalkboard to show that for every subtraction sentence there is a related addition sentence.

$$10 - 4 = 6 \quad 6 + 4 = 10 \quad 17 - 8 = 9 \quad 9 + 8 = 17$$

Then show the following chart on the chalkboard.

|     |     |      |      |     |      |
|-----|-----|------|------|-----|------|
| 10  | 17  | 23   | 68   | 32  | 81   |
| - 4 | - 8 | - 10 | - 25 | - 6 | - 37 |
| 6   |     |      |      |     |      |
| + 4 | + 8 | + 10 | + 25 | + 6 | + 37 |
| 10✓ |     |      |      |     |      |

Have the children help to complete the exercises. As soon as they note that the first number for each subtraction exercise is the same as the sum for each addition exercise, mark checks beside them as shown. Before the children attempt the last exercise in the chart, ask, "If the answer for  $81 - 37$  is correct, what should the sum be when we add that number to 37?"

- Write  $37 - 12$  on the chalkboard, as shown, and have a child complete it. Ask the children if they can suggest an addition

exercise to check the subtraction.

Lead the children to suggest adding 25 and 12. Write the addition exercise beside the subtraction exercise.

Have a child complete the addition exercise and state whether the sum shows that the subtraction exercise was completed correctly. Use checks and arrows to relate the same numbers in the two exercises.

Repeat the procedure for other exercises. Some of the subtraction exercises should be completed incorrectly and the errors discovered from the addition exercises. For these exercises, draw a ring around the minuend and another around the sum to point out that an error has occurred. Have the children determine the error and correct it.

### Using the Page

- Discuss the two completed exercises at the top of the page. Then let the children work independently on the page. You may wish to have them continue to draw the arrow as shown for the first three exercises and place checks beside equal minuends and sums.

$$\begin{array}{r} 37 \\ -12 \\ \hline 25 \end{array} \quad \begin{array}{r} 25 \\ +12 \\ \hline 37 \end{array}$$


# LESSON OUTCOME

Solve problems involving subtraction, regrouping, minuends to 99

## RELATED ACTIVITIES

- You may wish to have the children make a display showing cutouts representing dinosaur footprints and heads, using the measurements given in *Before Using the Page*. Beside these cutouts the children can show cutouts of their own footprints and heads.

Complete.

There were 94  's.

46 went away.  
How many were left?


$$\begin{array}{r} 94 \\ -46 \\ \hline 48 \end{array}$$

There were 60  's eating

33 stopped eating.  
How many were still eating?


$$\begin{array}{r} 60 \\ -33 \\ \hline 27 \end{array}$$

There are 51  's here.

There are 28  's there.


How many more here?

$$\begin{array}{r} 51 \\ -28 \\ \hline 23 \end{array}$$

There were 32  's drinking


15 were small.  
How many were big?


$$\begin{array}{r} 32 \\ -15 \\ \hline 17 \end{array}$$

There were 90  's.

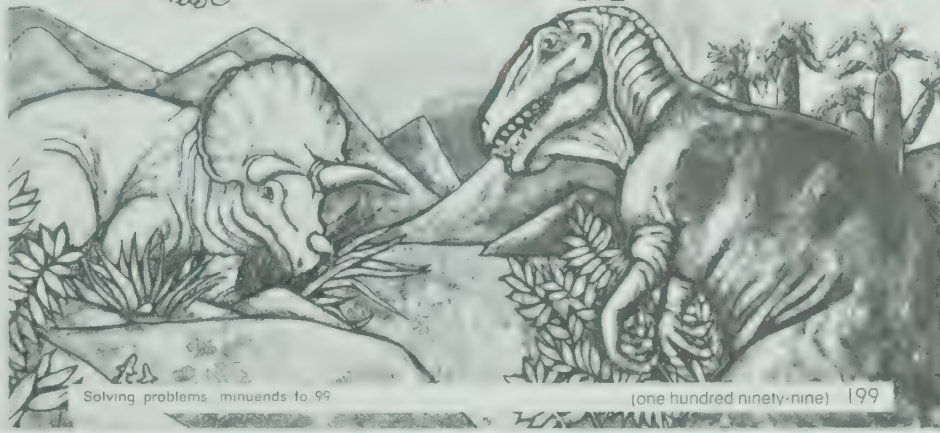
39 were lying down.  
How many were standing?

$$\begin{array}{r} 90 \\ -39 \\ \hline 51 \end{array}$$

There are 29  's here.

There are 47  's there.  
How many fewer here?

$$\begin{array}{r} 47 \\ -29 \\ \hline 18 \end{array}$$



Solving problems: minuends to 99

(one hundred ninety-nine) 199

## LESSON ACTIVITY

### Before Using the Page

- Since this unit is about prehistoric life, you may wish to write the following facts on the chalkboard and help the children to create problems for the facts. Then they may solve the problems.

- The largest dinosaur eggs discovered would have measured about 30 cm in length. Eggs that we eat are about 6 cm long.
- One kind of dinosaur had a footprint about 96 cm long. A human footprint is about 27 cm long.
- Some dinosaurs were about 85 dm tall. A man of average height is 18 dm tall.
- Some dinosaurs grew to about 12 m in height. A two-storey house is about 9 m high.
- Dinosaurs were large land animals. There were also large sea reptiles. One such reptile (Elasmosaurus) had the following approximate dimensions:

Head – 6 dm long      Body – 27 dm long  
Neck – 69 dm long      Tail – 24 dm long

- The length of the longest dinosaurs was approximately 30 m. Compare the lengths of objects and distances measured for pages 92 and 93 with this length. For example, find how many chalkboards have the same length as one of these dinosaurs.

### Using the Page

- The class may be divided into small groups so that in each group there is a child with good reading skills. This child can guide the others in the group who need help with the words in the problems. As an alternative, you may wish to record the problems on a tape cassette. Children with weak reading skills can listen to the tape and follow the words on the page at the same time.

For each problem, have the children record their work in the white region provided and then complete the statement to answer the question of the problem. You may wish to have the children check their answers by completing the corresponding addition for each subtraction.



## LESSON OUTCOME

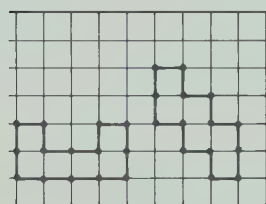
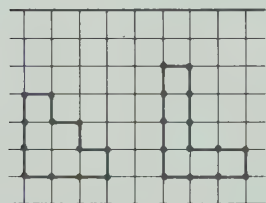
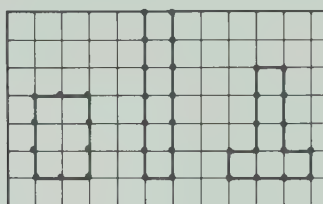
Count units of length to find the distance around a shape

### Materials

string or yarn, various objects for measuring the distance around, scissors, centimetre rulers, metre sticks, a copy of page T344 for each child

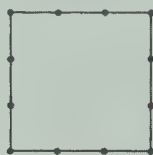
## RELATED ACTIVITIES

- Give the children copies of the work sheet shown and have them find the number of centimetres around each shape. Note that all the shapes are equal in area; that is, each shape contains six square centimetres.



—•— shows one centimetre.

Find the distance around each shape.



12 cm



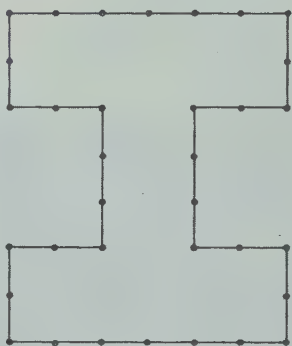
18 cm



20 cm



28 cm



34 cm



26 cm

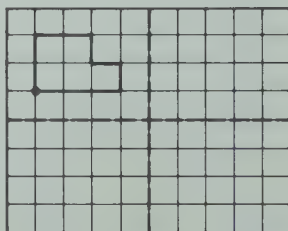
200 (two hundred)

Finding the distance around a shape

## LESSON ACTIVITY

### Before Using the Page

- Provide children with balls of string or yarn. Have them cut pieces of string to fit around any of the following: large and small attribute blocks; boxes, jars, cans, bottles; desks, books, tables, display boards, bookcases; their waists, necks, wrists, ankles.
- To review measuring in centimetres, have children measure the lengths of the strings cut in the previous activity.
- Have children use metre sticks and place them end to end to find the distance around the classroom or a section of the floor indicated with masking tape.
- Give each child a copy of page T344. Have them fold the paper in half and then in half again the opposite way so that there will be four sections when the paper is unfolded. Have them mark a dot near one edge of one section and tell



them that this dot indicates “home”. Show them how they may design their own “walk around the block” by following the grid lines, counting each centimetre step as they draw, and eventually returning home. They should find the total number of centimetre steps taken to “walk around the block”. They may draw four “blocks” on the paper provided. You may wish to have the children exchange their drawings and determine the number of centimetres around each other’s “blocks”.

### Using the Page

- Read the statements at the top of the page. Review the meaning of the symbol “cm”. Have the children use a crayon to mark one dot on each shape to show a starting point. Let the children select the dot themselves to emphasize that no matter which point is selected, all the children should obtain the same number of centimetres.

## LESSON OUTCOME

Measure the sides of a plane shape and then calculate the distance around the shape

### Materials

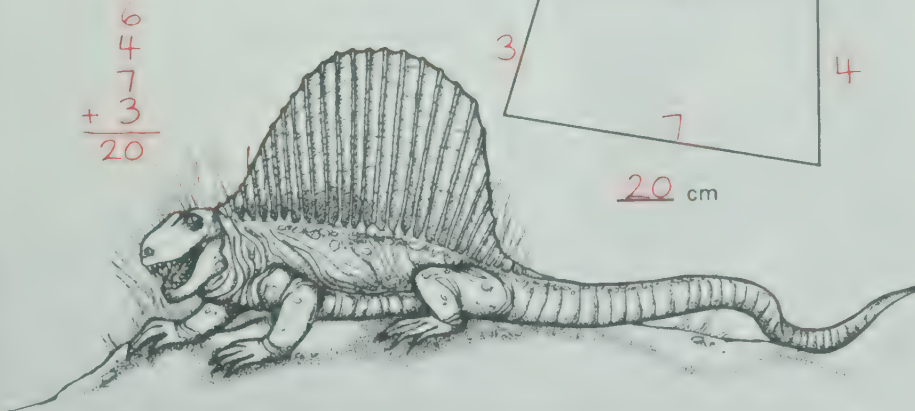
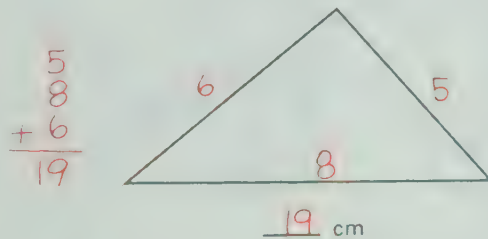
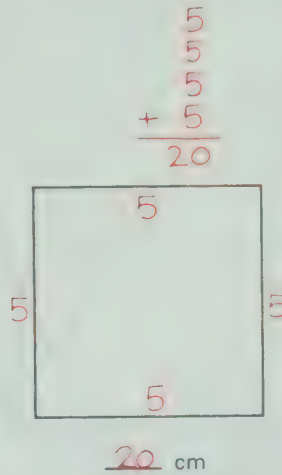
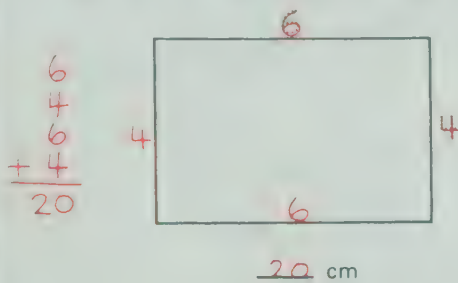
colored chalk, centimetre rulers, each child's copy of page 168 from Unit 8 (optional)

## RELATED ACTIVITIES

- Cut several pieces of string longer than 30 cm and tie the two ends of each piece together to make a loop 30 cm in length. Use pins or tacks on the display board to hold the loops in various shapes. The title of this display may be, for example, "Shapes that are 30 cm around".



Use a ruler to measure each side in centimetres. Then find the distance around each shape.



Finding the distance around a shape

(two hundred one) 201

## LESSON ACTIVITY

### Before Using the Page

- On the chalkboard, draw a triangle using a different color of chalk (red, yellow, blue) for each line segment. Print a capital letter at each vertex of the triangle. Ask these questions:

"What is the name of this shape?"

"How many sides has the triangle? How many corners has it?"

"What kind of letters are used to name the point at each corner?"

"What is the name of the red side? the blue side? the yellow side?"

"What is the name of the triangle?"

Have the children help to measure in centimetres the length of each side of the triangle and mark the length beside the line segment. Ask how they might find the distance around the triangle. Write the numbers in vertical form and have children determine the sum. Have several children state the order in which they added the three numbers. Write the sum on the chalkboard.

Draw a rectangle on the chalkboard and repeat the procedure.

- You may wish to have the children turn to page 168 in Unit 8 where they measured the sides of geometric shapes. Have them determine the distance around each of the five shapes and write it beside the shape.

### Using the Page

- Have the children measure and then write the number of centimetres for each side of the four shapes. Then ask them to determine the number of centimetres around each shape. You may wish to have the children print capital letters at the vertices of the shapes so that each shape and its sides can be referred to easily.

Before the children begin their measuring, you may wish to have them estimate which shape has the greatest distance around and which has the shortest distance around. Also, you may wish to ask whether they think any of the shapes will have the same distance around. The children may be surprised to find that three of the four shapes have the same distance around.



## LESSON OUTCOME

Count by fives

### Materials

a copy of page T335 for each child,  
demonstration number line, a flip chart  
for each child

## RELATED ACTIVITIES

- Have each child trace around one foot on colored paper and cut around the outline. You may wish to have each child print her/his name on the footprint. Paste the footprints in a row on chart paper. Have children, in turn, write a numeral under each footprint to indicate the number of toes up to that position in the row.

Have the children refer to the chart when answering questions such as:  
“How many toes are there for 5 feet?”  
“How many feet are there for 20 toes?”

Start at 5 and count by fives.  
Join the dots in order.

Count by fives.

202 (two hundred two)

Counting by fives

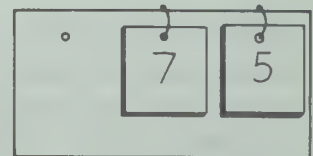
## LESSON ACTIVITY

### Before Using the Page

- Give each child a copy of page T335 marked to show 100 squares. Have the children mark an X in the upper right corner of the square where the numeral 5 would be and mark every fifth square after that, to reveal the pattern obtained for multiples of five. Ask them to count by fives from 5 to 100. Then have them write the numerals in the appropriate squares. Have the children color the squares in the left column green and those in the right column yellow. Ask what digit is in the ones' place of the numerals in the green column. Ask what digit is in the ones' place of the numerals in the yellow column.
- Use the demonstration number line to illustrate jumping by fives. Have children help to indicate the arrows and count aloud as they do.
- Have children respond to questions of the following types by using their flip charts that were prepared for page 75.  
“What number is five greater than 70?”  
“What number is five less than 65?”

Review the fact that when counting by fives from zero, the numerals will always have a 5 or a 0 in the ones' place.

- Draw the addition wheel on the chalkboard. Have the children determine the missing addends or sums required to complete the wheel.



### Using the Page

- Read the instructions with the children. Have them join the dots in order for the multiples of five shown. (Notice that the multiples of five to 60 appear twice.) At the bottom of the page have the children write the numerals in order for counting by fives to 60. Have them trace over the dotted numerals first and then continue as they count the eggs by fives. This arrangement of the numerals will prepare the children for telling time at the five-minute marks.

## LESSON OUTCOME

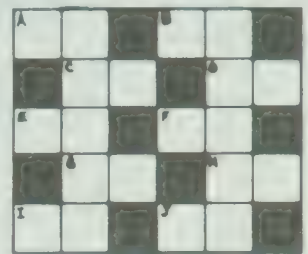
Complete tables involving counting by fives

### Materials

real money, play money, or coin cutouts from copies of page T327 (nickels), long cardboard strip, boxes of small objects (multiples of five to 100), small containers, a copy of the special table for each child

## RELATED ACTIVITIES

- You may wish to have the children complete the following cross-number puzzle. All the numerals are to be written across, not down.



- |   |         |   |             |
|---|---------|---|-------------|
| A | 30 + 5  | F | 25 + 2      |
| B | 45 - 5  | G | 40 - 5      |
| C | 25 + 5  | H | 3 fives + 1 |
| D | 3 fives | I | 2 fives     |
| E | 35 + 5  | J | 2 fives + 4 |



Each pile has 5 eggs.  
How many eggs?

| Piles | Eggs |
|-------|------|
| 1     | 5    |
| 2     | 10   |
| 3     | 15   |
| 4     | 20   |
| 5     | 25   |
| 6     | 30   |
| 7     | 35   |
| 8     | 40   |
| 9     | 45   |
| 10    | 50   |
| 11    | 55   |
| 12    | 60   |

| Piles | 2  | 4  | 6  | 8  | 10 | 12 |
|-------|----|----|----|----|----|----|
| Eggs  | 10 | 20 | 30 | 40 | 50 | 60 |

| Piles | 1 | 3  | 5  | 7  | 9  | 11 |
|-------|---|----|----|----|----|----|
| Eggs  | 5 | 15 | 25 | 35 | 45 | 55 |

| Piles | Eggs |
|-------|------|
| 3     | 15   |
| 6     | 30   |
| 9     | 45   |
| 12    | 60   |



Completing tables involving counting by fives

(two hundred three) 203

## LESSON ACTIVITY

### Before Using the Page

- Using real money or coin cutouts, tape or glue 12 nickels to a long strip of cardboard. Have children write the number of nickels and the number of cents for each coin as shown.

| 1  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|    |     |     |     |     |     |     |     |     |     |     |     |
| 5¢ | 10¢ | 15¢ | 20¢ | 25¢ | 30¢ | 35¢ | 40¢ | 45¢ | 50¢ | 55¢ | 60¢ |

Ask questions of the following two types:

- "How many cents are there for 6 nickels?"
- "How many nickels are there for 45 cents?"

- Have the children work together in small groups. Give each group a box containing beads or similar objects in a multiple of five (not more than 100 objects). Give each group several small paper cups or other suitable containers. Have the children sort the beads into groups of five, putting five beads into each con-

tainer. After all the beads have been sorted, have the children count by fives to determine the total number of beads.

After the children have repeated this activity several times, give each child a copy of the table to complete. They may refer to any aids displayed in the classroom (number line, hundred chart), if necessary.

### Using the Page

- Because the exercises on the page are similar to those of the last activity in *Before Using the Page*, the children should be able to work independently. After they have completed the page, discuss the patterns formed.

| cups | beads |
|------|-------|
| 1    | 5     |
| 2    |       |
|      | 15    |
|      | 20    |
|      | 25    |
| 6    |       |
| 7    |       |
|      |       |
|      | 45    |



## LESSON OUTCOME

Telling time at five-minute marks

## Materials

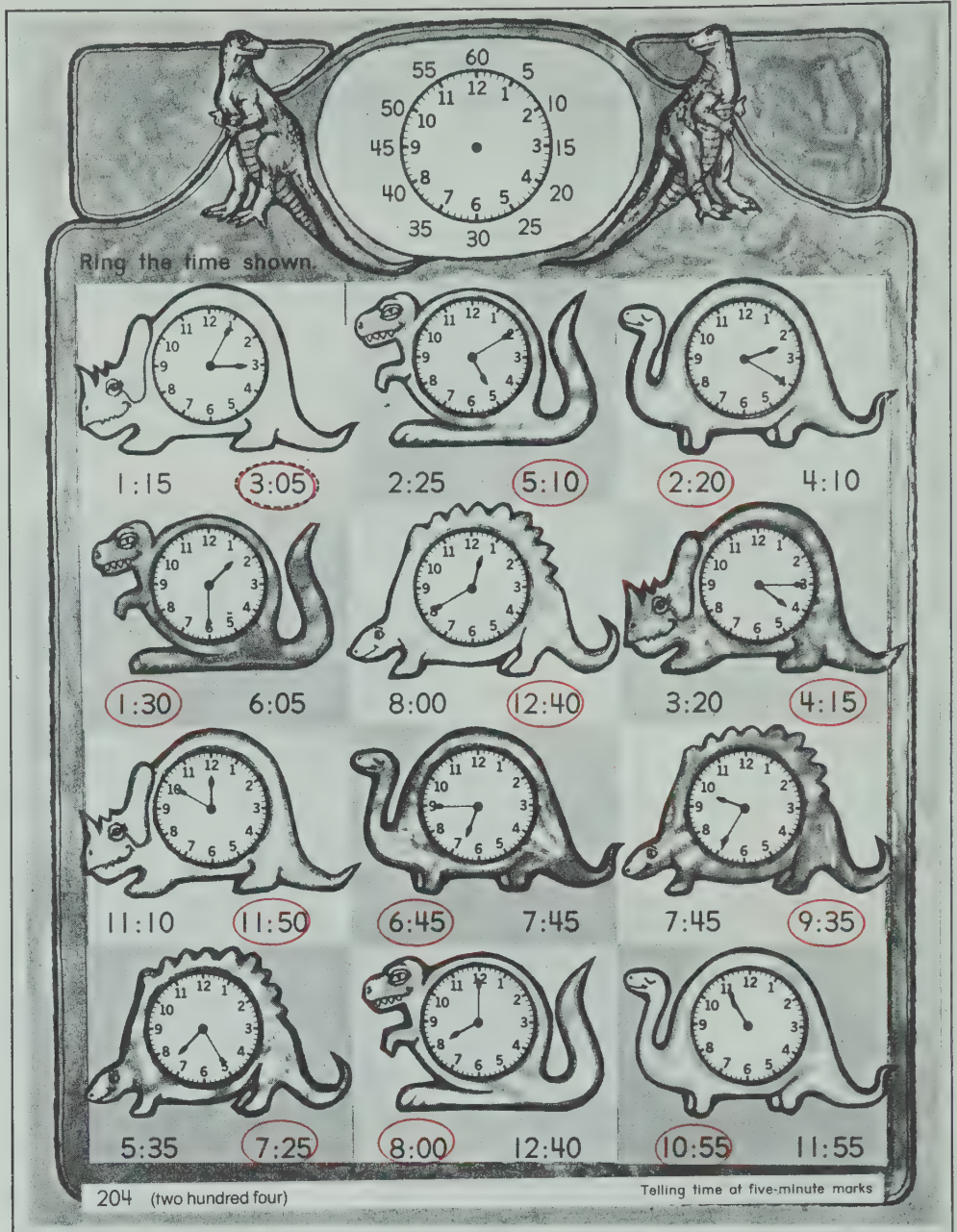
demonstration clock, a paper-plate clock face for each child, a work sheet showing a large circle divided into 60 equal parts

## Vocabulary

minutes, minute hand, hour hand

## RELATED ACTIVITIES

- Have the children tell the names of some of their favorite TV programs and the times at which these begin. Make a list of the times. Set the demonstration clock to show a time at a five-minute mark and ask children which program they would be watching.



## LESSON ACTIVITY

## Before Using the Page

- Use a demonstration clock face marked to show hours and minutes. Point to the multiples of five on the clock face as you have the children count by fives to 60. Repeat the counting, but have the children repeat the word *minutes* after saying each multiple of five: "Five minutes, ten minutes, fifteen minutes, . . . , sixty minutes." Ask the children how much time has passed when the long hand has moved round the clock face once (one hour). Then ask how many minutes this is. Identify the long hand as the *minute hand* and the short hand as the *hour hand*.
- Make a work sheet showing a large circle divided into 60 equal parts, with thicker lines for every fifth line. Have the children color alternate sections to show five-minute intervals.
- Show times on the demonstration clock face and have children identify them, for example, 3:00, 9:30, 10:15, 7:45.

Discuss the position of the hour hand at 3:00, 3:15, 3:30, and 3:45. Then state times, to the quarter-hour, or use flash cards. Have the children show the times on their clock faces.

- Set a real clock to show 4:00. Ask what time is shown. Move the minute hand round the clock face, stopping at each five-minute mark, and have the children count by fives. Start at 4:00 again and repeat the procedure, but have the children repeat the times after you, saying, "Four-o-five, four-ten, four-fifteen, four-twenty, . . . , four-fifty-five o'clock." Write the numerals for the times that were just stated (4:05, 4:10, 4:15, 4:20, . . . , 4:55, 5:00).

Set the demonstration clock to show 5:00 and have the children do the same on their paper-plate clock faces. Move the minute hand round the clock face, stopping at each five-minute mark. Have the children state the time at each five-minute mark.

- Show times, at random, at the five-minute marks on the demonstration clock and have children state the times. Have other children write the corresponding numerals on the chalkboard for the times shown.

## Using the Page

- Have the children ring the time shown on each clock face. They may use the illustration at the top of the page for help.



## LESSON OUTCOME

Recording time at five-minute marks

## Materials

a special work sheet for each child,  
demonstration clock, a paper-plate  
clock face for each child

## RELATED ACTIVITIES

- Show a time, to the half-hour, on a clock face. Have children show what the time would be 2 hours earlier, 2 hours later, one-half hour earlier, one-half hour later, 2 hours earlier, 2 hours later.
- You may wish to have children play the game "Clock Walk" described on page T275.
- During one of the class activities, you may wish to set a timer to ring five minutes later, in order to give the children an idea of a five-minute interval.

Write the time shown.

Recording time at five-minute marks

(two hundred five) 205

## LESSON ACTIVITY

## Before Using the Page

- Point to the numerals on a clock face and have children count by fives to 60.
- Prepare copies of the diagram shown and give one to each child. Have the children print the numerals for the hours around the inner circle. Have them print the numerals for minutes at the five-minute marks around the outer circle. Have the children draw hands on the clock face to show 4:30. Ask where the minute hand points. Then help them to determine where the hour hand should point.
- Show various times, to the quarter-hour, on the demonstration clock. Have children show each time, in turn, on their paper-

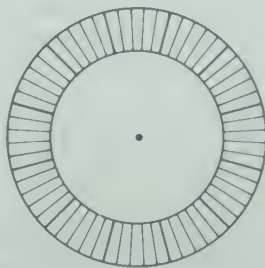


plate clock faces and then state what time is shown. Have several children write the numerals for the times on the chalkboard.

- State times, to the quarter-hour, and have children show these on their clock faces. They may hold up the clock faces for you to check. You may prefer to show the correct time on the demonstration clock and have the children check their own clock faces. For each time, discuss the position of the minute hand and the appropriate position of the hour hand.
- Show various times at the five-minute marks on the demonstration clock. Have the children write the numeral for each time shown.

## Using the Page

- Read the instruction to the children. Discuss the time shown on the first clock face. Then let the children work independently while you help those who are having difficulty.
- After the children have completed the page, ask questions about each clock face; for example, "Where does the hour hand point?" "Where does the minute hand point?" "How many minutes is this?" "What time is shown?"



## LESSON OUTCOME

Identify a set of hundreds, a set of tens, and a set of ones and write the corresponding three-place numeral, numbers from 200 to 999

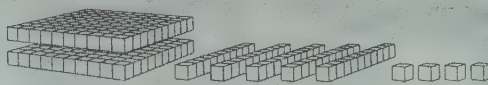
### Materials

models for hundreds, tens, and ones

## RELATED ACTIVITIES

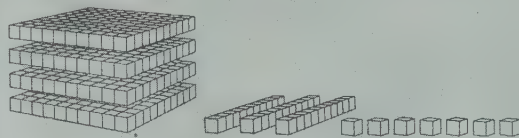
- Have the children work in pairs using 9 hundreds, 9 tens, and 9 ones, and adapt the abacus chart suggested in *Before Using the Page* on page T90.
- Give each child a sheet of paper. At a given signal, have the children begin to make as many strokes to represent tens as possible in one minute or less. At the end of this time, have the children ring sets of ten strokes to represent one hundred. Have them count the hundreds formed and the tens left over.

Complete.



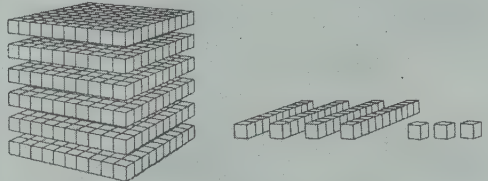
| hundreds | tens | ones |
|----------|------|------|
| 2        | 5    | 4    |

254



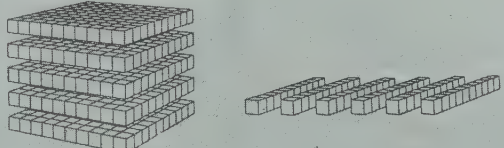
| hundreds | tens | ones |
|----------|------|------|
| 4        | 3    | 7    |

437



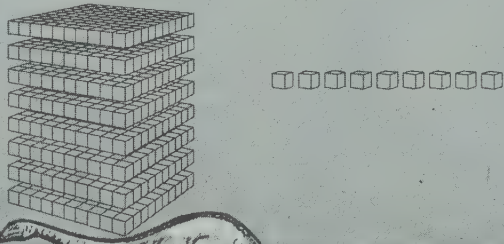
| hundreds | tens | ones |
|----------|------|------|
| 6        | 4    | 3    |

643



| hundreds | tens | ones |
|----------|------|------|
| 5        | 6    | 0    |

560

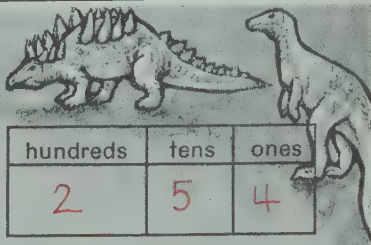
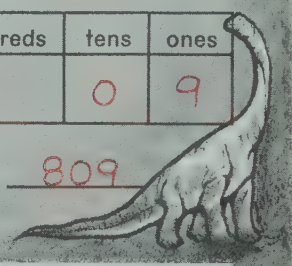


| hundreds | tens | ones |
|----------|------|------|
| 8        | 0    | 9    |

809

206 (two hundred six)

Representing numbers to 999 using hundreds, tens, and ones

## LESSON ACTIVITY

### Before Using the Page

- Display nine ones and have a child count them. Add another one and ask how many there are. Ask what can take the place of ten ones. Remove the ones and replace them with a model of ten. Display nine more tens. Have a child count them by tens aloud. Ask what can take the place of ten tens. Remove the tens and replace them with a model of one hundred.

Have the children count by hundreds to 900 as you display eight more hundreds in turn. Then remove them one at a time as the children count backward from 900 to 100. Leave the last one hundred on display. Ask what can take the place of one hundred. Remove it and display ten tens. Have the children count backward by tens from 100 as you remove each model of ten in turn. Then replace the last ten by ten ones and have the children count from ten to zero.

- Have several children write on the chalkboard the numerals for hundreds from 100 to 900 and use models to illustrate each.
- Draw a chart on the chalkboard with the headings shown. Use

models to represent several three-digit numbers in turn. Include examples such as 390, 504, 169, 325. Have children count the hundreds, tens, and ones

| hundreds | tens | ones |     |
|----------|------|------|-----|
| 3        | 9    | 0    | 390 |
| 5        | 0    | 4    | 504 |
| 1        | 6    | 9    | 169 |

for each example and record the number in the chart. Note that, in some instances, the number of ones or tens will be zero. Help the children to read the numerals in the chart and to write the standard numerals beside the chart. You may cover the hundreds' digit first to enable the child to read the two-place numeral. Then uncover it and have the child read the three-place numeral. Remind the children that 390, for example, is read "three hundred ninety". (No "and" appears between "hundred" and "ninety".)

### Using the Page

- Have the children count the hundreds, tens, and ones shown in the first exercise and write the numerals in the chart. Then have them write the standard numeral below the chart.

## LESSON OUTCOME

Write numerals for numbers to 999

## Materials

models for hundreds, tens, and ones.  
pocket chart as described in *Before Using the Page*, three cards for each of the numerals 1 to 9 and two cards for 0, a sheet of paper for each child

## RELATED ACTIVITIES

- You may wish to extend the work with word names for numbers that was suggested in *Related Activities* on page T183. Have children help to print the words *one* to *nine* in one column on a chart, the words for multiples of ten from *ten* to *ninety* in another column, and the word *hundred* in a third column. Have the children refer to this chart to help them print the words for two-digit and three-digit numbers to 999. They may check their work for numbers to 250 by looking at the appropriate pages in their books.
- You may wish to have children play the game "Dinosaur Ride" described on page T275.

Complete.



| h | t | o |
|---|---|---|
| 3 | 2 | 4 |

324

| h | t | o |
|---|---|---|
| 4 | 4 | 5 |

445

7 hundreds 8 tens 4 ones

| h | t | o |
|---|---|---|
| 7 | 8 | 4 |

784

5 hundreds 9 tens 6 ones

| h | t | o |
|---|---|---|
| 5 | 9 | 6 |

596

6 hundreds 7 tens 8 ones

| h | t | o |
|---|---|---|
| 6 | 7 | 8 |

678

9 hundreds 5 tens 3 ones

| h | t | o |
|---|---|---|
| 9 | 5 | 3 |

953

8 hundreds 6 tens 0 ones

| h | t | o |
|---|---|---|
| 8 | 6 | 0 |

8604 hundreds 7 tens 7 ones 4776 hundreds 3 tens 0 ones 6308 hundreds 0 tens 6 ones 8069 hundreds 5 tens 2 ones 9522 hundreds 9 tens 9 ones 299

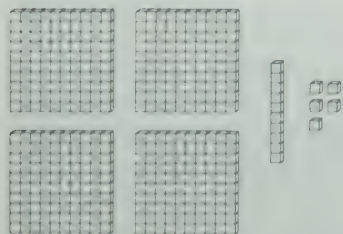
Writing numerals to 999

(two hundred seven) 207

## LESSON ACTIVITY

## Before Using the Page

• Draw a chart on the chalkboard with the headings shown. Ask children what each letter represents. Display some hundreds, tens, and ones. Have children count how many there are of each and write the numerals in the chart. Have a child state what number is represented and print the standard numeral beside the chart. Repeat for other numbers.



| h | t | o |
|---|---|---|
| 4 | 1 | 5 |
|   |   |   |
|   |   |   |
|   |   |   |

415

- Prepare a simple pocket chart using a sheet of cardboard and three library-card pockets. Use numeral cards for 1 to 9 for the

hundreds' pocket, 0 to 9 for the tens' pocket, and 0 to 9 for the ones' pocket.

Give each child a sheet of paper on which to draw a chart like the one for the first activity. Have several children help to select cards for the pocket chart and place them in the three pockets. Have the children write the numerals in the charts they drew. Then have them write the standard numeral. Ask one child to state the number represented as hundreds, tens, and ones. Ask another child to read the standard numeral. Repeat the procedure for other numbers.

Children who are capable should be encouraged to write the standard numeral without the use of the chart and its headings.

## Using the Page

- Discuss with the children how they are to proceed on the page—the exercises are an extension of the activities suggested in *Before Using the Page*. After they have completed the page, have several children read the expanded numerals naming the place values, and then read the corresponding numerals in standard form.



## LESSON OUTCOME

Demonstrate an understanding of three-place numerals

### Materials

models for hundreds, tens, and ones, pocket chart and numeral cards as suggested on page T265, special work sheet for each child

## RELATED ACTIVITIES

- You may wish to have the children complete a work sheet similar to this one.

- In 635 the 3 means 3 hundreds ~~tens~~ ones
- In 324 the 3 means 3 hundreds tens ones
- In 403 the 0 means 0 hundreds tens ones

Complete.

327 means 3 hundreds 2 tens 7 ones

946 means 9 hundreds 4 tens 6 ones

530 means 5 hundreds 3 tens 0 ones

709 means 7 hundreds 0 tens 9 ones

843 means 8 hundreds 4 tens 3 ones

668 means 6 hundreds 6 tens 8 ones



Ring the numerals that have 3 in the ones' place.

Use a ✓ to mark the numerals

that have 8 in the tens' place.

Use an X to mark the numerals

that have 5 in the hundreds' place.

|       |       |       |       |
|-------|-------|-------|-------|
| 438   | 284   | (153) | (243) |
| X 508 | ✓ 781 | 935   | X 505 |
| ✓ 185 | (803) | X 518 | 326   |
| 835   | X 512 | (683) | 625   |
| (893) | X 583 | X 523 | 754   |



208 (two hundred eight)

Understanding three-place numerals

## LESSON ACTIVITY

### Before Using the Page

- Using models of hundreds, tens, and ones, display 3 hundreds, 4 tens, and 5 ones. Ask how many there are of each. Have children place numeral cards in the appropriate pockets of the pocket chart suggested on page T265. Have a child state the number represented and write the standard numeral on the chalkboard. Repeat the procedure for other numbers.

Write the numerals 432, 325, 674, 580, 203, and 601 on the chalkboard. For the first number, have children place numeral cards in the appropriate pockets of the chart as you say, "Which digit tells how many hundreds there are? Place the card in the hundreds' pocket. How many tens are there? Place the card in the tens' pocket. Place a card in the pocket to show how many ones there are. Read how many there are of each. What number is represented?" Repeat for each of the other numbers.

- Have the children use models of hundreds, tens, and ones to represent the numbers discussed in the preceding activity.
- Give each child a work sheet as shown.

\_\_\_\_ means \_\_\_\_ hundreds \_\_\_\_ tens \_\_\_\_ ones  
 \_\_\_\_ means \_\_\_\_ hundreds \_\_\_\_ tens \_\_\_\_ ones  
 \_\_\_\_ means \_\_\_\_ hundreds \_\_\_\_ tens \_\_\_\_ ones

Write standard numerals for three-digit numbers on the chalkboard. Have the children write the standard numerals in the first column. Then have them show how many hundreds, tens, and ones there are for each number.

### Using the Page

- The children should be able to work independently for the first part of the page.

Read the instructions for the second part of the page. When the children understand what they are to do, caution them to look at all the ones' digits first and ring those numerals having 3 as the ones' digit. Then have them mark with a check the numerals having 8 as the tens' digit. Finally, have them mark with an X the numerals having 5 as the hundreds' digit.

After the children have marked the numerals, they will notice that some numerals are marked more than once. Discuss the reason for this.

## LESSON OUTCOME

Order the numbers to 999

## Materials

flip charts and materials to extend the charts to include hundreds (one set of numeral cards for 1 to 9 and a pipe cleaner for each child)

## RELATED ACTIVITIES

- You may wish to have the children play the following game in pairs. Each child has a set of numeral cards for 1 to 9 in a bag. Each child draws three cards at random and arranges them to represent the greatest number possible. The child whose number is greater scores one point. The cards are returned to the bags and each bag is shaken before three new cards are drawn. After ten rounds, the player having the most points is the winner. The rules may be adapted so that the players try to form the least number possible.

Complete.

|     |     |            |            |            |            |            |            |
|-----|-----|------------|------------|------------|------------|------------|------------|
| 96  | 97  | <u>98</u>  | <u>99</u>  | <u>100</u> | 101        | <u>102</u> | 103        |
| 196 | 197 | <u>198</u> | <u>199</u> | <u>200</u> | 201        | <u>202</u> | <u>203</u> |
| 325 | 326 | <u>327</u> | <u>328</u> | <u>329</u> | <u>330</u> | 331        | <u>332</u> |
| 596 | 597 | <u>598</u> | <u>599</u> | <u>600</u> | 601        | <u>602</u> | <u>603</u> |
| 748 | 749 | <u>750</u> | <u>751</u> | <u>752</u> | <u>753</u> | <u>754</u> | <u>755</u> |
| 897 | 898 | <u>899</u> | <u>900</u> | <u>901</u> | <u>902</u> | <u>903</u> | <u>904</u> |

What number comes before?

|            |     |            |     |            |     |            |     |
|------------|-----|------------|-----|------------|-----|------------|-----|
| <u>213</u> | 214 | <u>148</u> | 149 | <u>606</u> | 607 | <u>529</u> | 530 |
| <u>462</u> | 463 | <u>349</u> | 350 | <u>199</u> | 200 | <u>299</u> | 300 |
| <u>399</u> | 400 | <u>499</u> | 500 | <u>599</u> | 600 | <u>699</u> | 700 |

What number comes after?

|     |            |     |            |     |            |     |            |
|-----|------------|-----|------------|-----|------------|-----|------------|
| 976 | <u>977</u> | 250 | <u>251</u> | 369 | <u>370</u> | 99  | <u>100</u> |
| 899 | <u>900</u> | 799 | <u>800</u> | 299 | <u>300</u> | 499 | <u>500</u> |
| 316 | <u>317</u> | 604 | <u>605</u> | 815 | <u>816</u> | 770 | <u>771</u> |

What number comes between?

|     |            |     |     |            |     |     |            |     |
|-----|------------|-----|-----|------------|-----|-----|------------|-----|
| 499 | <u>500</u> | 501 | 676 | <u>677</u> | 678 | 339 | <u>340</u> | 341 |
| 799 | <u>800</u> | 801 | 491 | <u>492</u> | 493 | 864 | <u>865</u> | 866 |

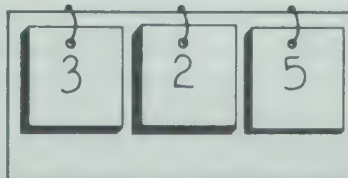
Order of the numbers to 999

(two hundred nine) 209

## LESSON ACTIVITY

## Before Using the Page

- Have the children extend the flip charts they made for page 75 to include hundreds. They will need a set of numeral cards for 1 to 9 and a pipe cleaner.



Give instructions and ask questions similar to the following. Have the children respond by showing numerals on their charts and holding them up for you to check each time.

“Show three hundred twenty-five. Show the number after it.”

“Show four hundred thirty. Show the number before it.”

“Show four hundred ninety-nine. Show the number that is two greater than it.”

“Show six hundred fifty. Show the number two less than it.”

“Show five hundred seventy-five. Show the number that is ten greater than it.”

“Show 8 hundreds, 0 tens, 5 ones. What number is this? Start at 805 and count on to 820.”

Have one group of children show 699. Have another group show 701. Have the remaining children show the number that comes between these two numbers. Repeat for other numbers.

Have ten or more children take their flip charts and stand in a row. Have the first child show a number. Have the next child show the number that is one greater than the first number. Have the third child show the number that is one greater than the second number, and so on. Have children who are not in the row read the sequence of numbers.

Have a child whose flip chart shows a certain number raise one hand. Have a child not in the row count on five more to reach the number that is five greater than the first number. Repeat for other numbers.

## Using the Page

- Read the instruction that precedes each set of exercises and then let the children work independently. After the children have completed the page, ask questions about the first set of exercises. For example, “Which is greater, 597 or 601?”



## LESSON OUTCOME

Write amounts of money from one dollar to one dollar and ninety-nine cents using dollars-and-cents notation

### Materials

real money, play money, or cutouts from copies of pages T327 and T328, cards showing amounts of money from \$1.00 to \$1.99, pictures showing a one-dollar bill and coins for amounts to \$1.99








## RELATED ACTIVITIES

- Children may "shop" at the play store for items having prices to \$1.99 and pay for them using the exact amount of money. The shopkeeper must determine whether the amount given in payment is correct.

100 pennies

one dollar \$1.00

How much?

|  |  |
|--|--|
|     | 1 dollar and 10 cents<br><u>110</u> cents    \$ <u>1.10</u>        |
|    | 1 dollar and <u>30</u> cents<br><u>130</u> cents    \$ <u>1.30</u> |
|    | 1 dollar and <u>21</u> cents<br><u>121</u> cents    \$ <u>1.21</u> |
|     | 1 dollar and <u>1</u> cent<br><u>101</u> cents    \$ <u>1.01</u>   |
|     | 1 dollar and <u>5</u> cents<br><u>105</u> cents    \$ <u>1.05</u>  |
|    | 1 dollar and <u>25</u> cents<br><u>125</u> cents    \$ <u>1.25</u> |
|  | 1 dollar and <u>50</u> cents<br><u>150</u> cents    \$ <u>1.50</u> |

210 (two hundred ten)

Writing dollars-and-cents notation

## LESSON ACTIVITY

### Before Using the Page

- Display ten dimes. Have the children count by tens to determine the total number of cents. Write "100 cents" on the chalkboard. Ask what may take the place of the dimes and still have the same value. Lead the children to suggest a one-dollar bill. Replace the dimes with a one-dollar bill. Write "1 dollar" on the chalkboard. Ask if anyone knows of another way to write "one dollar". If not, write "\$1.00" on the chalkboard. Point out the symbol \$ and the dot. Explain that the dot is used to keep the number of dollars separate from the number of cents.

100 cents  
1 dollar  
\$1.00

114 cents  
1 dollar and 14 cents  
\$1.14

- Display 11 dimes and 4 pennies. Have children count by tens and then by ones to determine the total number of cents. Write this as shown. Ask what could take the place of ten dimes because it has the same value. Then ask how many dollars and

how many cents there are. Write this as shown. Then write the amount in dollars-and-cents notation. Have a child read the numeral as "one dollar and fourteen cents".

Repeat the procedure for other combinations of one dollar and some coins and write the results on the chalkboard.

- Work with the children in small groups. Display cards showing amounts of money from \$1.00 to \$1.99. Have the children use real money or cutouts from copies of pages T327 and T328 to show each amount. Then have a child read the numeral on the card and state the equivalent number of cents.
- Display pictures showing a one-dollar bill and coins for amounts to \$1.99. Have children select a card showing the amount that corresponds to the picture. If you prefer, you may have the children write the amount, using dollars-and-cents notation.

### Using the Page

- Discuss the fact that 100 pennies and a one-dollar bill have the same value (100 cents). Ask why people prefer to have a one-dollar bill rather than 100 pennies. Then let the children work independently.

Ring each set that has the value \$1.28.



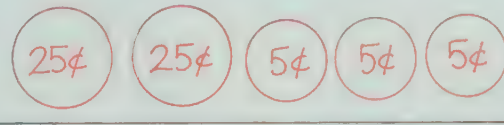
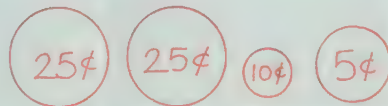
Ring each set that has the value \$1.45.



Ring each set that has the value \$1.56.



Draw coins to show two ways to make \$1.65. *Answers may vary.*



Interpreting dollars-and-cents notation

(two hundred eleven) 211

## LESSON OUTCOME

Interpret dollars-and-cents notation

### Materials

real money, play money, or cutouts from copies of pages T327 and T328.  
pairs of cards showing two numerals for an amount of money from \$1.01 to \$1.99

## RELATED ACTIVITIES

- Children may cut pictures of items having prices from \$1.01 to \$1.99 from catalogues and newspapers. Have them paste each picture on a separate sheet of paper. They may either draw or paste pictures of bills and coins to show how they would pay for each item.
- Prepare several amounts of money (to \$1.99) using a one-dollar bill and some coins, and place each in an envelope. Label the envelopes A, B, C, and so on. Distribute the envelopes and have children determine the amounts of money. Have the children record the letter that identifies the envelope and the amount. Then ask them to exchange envelopes.

## LESSON ACTIVITY

### Before Using the Page

- Display a one-dollar bill. Have children identify it by name and state its value in cents. Have children write the amount on the chalkboard using dollars-and-cents notation and then as a standard numeral for a number of cents (\$1.00, 100 cents).

Display a one-dollar bill, a quarter, and a nickel. Have children determine the amount of money in dollars and cents, state the total value in cents, and write the corresponding numerals on the chalkboard (\$1.30, 130 cents).

- Prepare pairs of cards showing two numerals for an amount of money (\$1.06, 106 cents) to \$1.99. Have children match the number of cents with the dollars-and-cents notation and read the amounts.

- Display a one-dollar bill, one dime, and two pennies. Ask what amount of money is shown. Have a child write the amount in dollars-and-cents notation on the chalkboard. Repeat for other amounts to \$1.99.

- Have children use real money or cutouts to show a given amount of money, for example, \$1.37. Each child must use a one-dollar bill. Restrict the number of pennies to four. Discuss the different ways used to show the amount. These may be recorded in a chart as shown. Repeat for different amounts to \$1.99.

| \$1.00 | 25¢ | 10¢    | 5¢ | 1¢ | How much? |
|--------|-----|--------|----|----|-----------|
| 1      | 25  | 10     |    | 11 | \$1.37    |
| 1      | 25  |        | 55 | 11 | \$1.37    |
| 1      |     | 101010 | 5  | 11 | \$1.37    |

### Using the Page

- Have the children ring the sets of money that have the given values. For the second part of the page, have the children draw coins so that the value of the money is \$1.65; this is to be done in two different ways. Some children may wish to show more than two ways.



## LESSON OUTCOME

Identify flips

### Materials

cutouts of shapes, numerals, and letters from page T241, a special work sheet for each child, pins, a sheet of paper and a geometric shape for illustrating a flip for each child, shapes from copies of page T346

### Vocabulary

flip

## RELATED ACTIVITIES

- You may wish to have the children determine which diagrams on page 212 illustrate slides (second, fifth, and sixth).
- Have the children review or repeat some of the activities suggested for line symmetry on pages T76 and T77. Discuss how one half of a shape can be flipped over the line of symmetry to match the remaining half.

Can you flip the red shape to fit the blue shape?

Yes No Yes No Yes No

Yes No Yes No Yes No

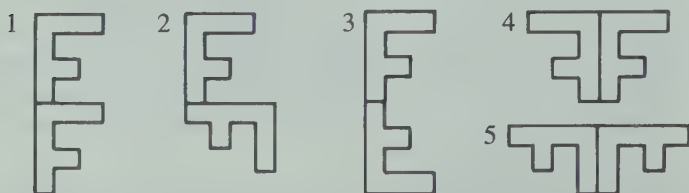
Yes No Yes No Yes No

212 (two hundred twelve) Identifying flips

## LESSON ACTIVITY

### Before Using the Page

- Review slides and turns from pages T240 and T241 by using the cutouts of shapes, numerals, and letters prepared earlier.
- Use the cutout of the letter F prepared for page T241 and a sheet of five diagrams showing the letter F in the positions below. Give a copy to each child.



For each of the diagrams, have children tell whether they think the cutout can start from one position and slide to fit the second position. Then have them demonstrate to check.

Have the children consider each of the diagrams in terms of a turn. Have pins available so that the children can check their answers. After each diagram has been discussed in terms of

slides and turns, children will notice that for diagrams 3, 4, and 5, the cutout can neither slide nor turn from one position to fit the other. Tell them that there is a way to make the cutout start at one position and move to fit the other.

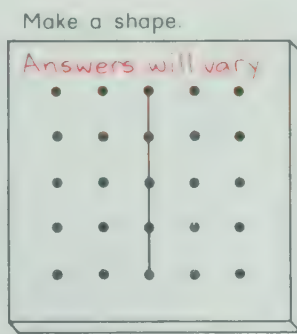
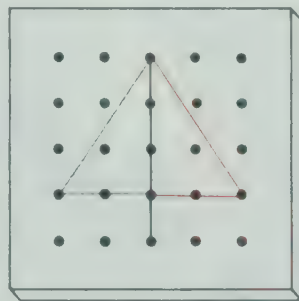
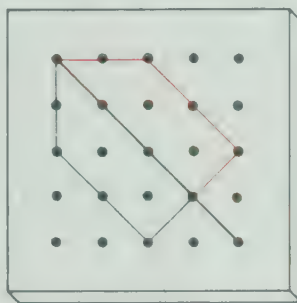
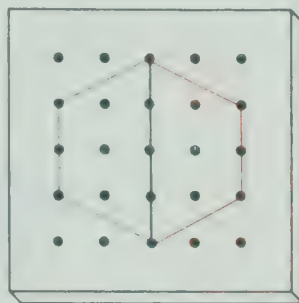
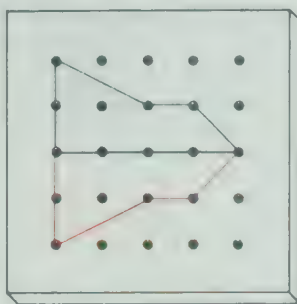
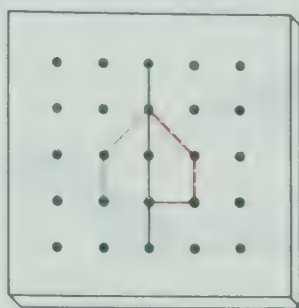
Give the children a few minutes to experiment with the cutout. They may come up with the idea of flipping the cutout. Introduce the word *flip* and print it on the chalkboard. Demonstrate how to flip the cutout for diagrams 3, 4, and 5.

- Demonstrate flips using cutouts of geometric shapes. Then give each child a sheet of paper on which a straight line has been drawn, and a geometric shape on which the edge to be used for flipping has been indicated in red. Have the children place the red edge of the shape along the line and trace around the shape. Have them flip the shape over the line and trace around it again. When the children have finished, have them fold the sheet along the line and check that the two shapes match.

### Using the Page

- Read the question at the top of the page to the children. You may wish to give cutouts of the shapes from copies of page T346 to the children so that they can test the diagrams.

Draw the other half of each shape.



Completing shapes to show line symmetry

(two hundred thirteen) 213

## LESSON OUTCOME

Complete shapes to show line symmetry

### Materials

a sheet of paper for each child, scissors, a special work sheet for each child, straight edges, geoboards and rubber bands, copies of page T341 or T342 for geopaper

### RELATED ACTIVITIES

- You may wish to have the children make copies on geopaper of the diagrams on page 213 and check their answers by folding along the line of symmetry.

Colored sheets of Plexiglas are effective for this type of activity and are safe to use because they will not break. Since they are semitransparent, a given outline can be seen through them while the image being drawn is seen as a reflection.

## LESSON ACTIVITY

### Before Using the Page

- Give each child a sheet of paper. Have the children fold the sheets in half and cut a shape that includes the fold. When the shape is unfolded, discuss how the two parts of the shape are alike. Have the children use a straight edge to draw over the fold line. Review the term *line of symmetry*.
- Prepare a work sheet showing shapes, some of which have a line of symmetry. Have the children cut out each shape and test it for line symmetry by folding to see whether the parts match.



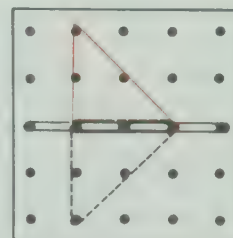
- Place a rubber band on a geoboard and tell the children that this will represent the line of symmetry of a shape. Use another rubber band to form one half of the shape on one side of the line.

Have a child use a rubber band to form the other half of the shape on the opposite side of the line. Repeat for different shapes. Then you may wish to have the children use geoboards and work in pairs. One child forms one half of a shape on one side of the line and the other child completes the shape. If no geoboards are available, have the children use geopaper.

### Using the Page

- Have the children use a straight edge to draw over the broken line segments that form the other half of the first shape. Discuss the number of sides that each completed shape will have. Then let the children work independently.

For the last exercise, have the children draw half a shape on one side of the line of symmetry. You may wish to have the children complete their own shapes, or you may prefer to have them complete shapes drawn by other children.





# OBJECTIVE

Add and subtract two-digit numbers, no regrouping, sums and minuends to 99

## Materials

models for tens and ones, overhead projector

## RELATED ACTIVITIES

• The code on pages 214 and 215 can be used to derive the names of a few dinosaurs. You may wish to give the names to capable children in the class and have them create addition and subtraction exercises for the letters of the names. Then other children can decode the names. One example is provided. Other suitable names are *Brontosaurus*, *Lambeosaurus*, and *Tyrannosaurus*. When the names have been decoded, children can match the names with pictures of dinosaurs in books from the library.

$$\begin{array}{r} 23 \\ + 34 \\ \hline \end{array} \quad \begin{array}{r} 85 \\ - 23 \\ \hline \end{array} \quad \begin{array}{r} 42 \\ + 20 \\ \hline \end{array} \quad \begin{array}{r} 89 \\ - 11 \\ \hline \end{array}$$

A L L O

$$\begin{array}{r} 31 \\ + 32 \\ \hline \end{array} \quad \begin{array}{r} 97 \\ - 40 \\ \hline \end{array} \quad \begin{array}{r} 79 \\ - 41 \\ \hline \end{array} \quad \begin{array}{r} 58 \\ - 33 \\ \hline \end{array}$$

S A U R

$$\begin{array}{r} 15 \\ + 23 \\ \hline \end{array} \quad \begin{array}{r} 99 \\ - 36 \\ \hline \end{array}$$

U S

This is a code.

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| 10 | 12 | 25 | 36 | 38 | 45 | 47 | 53 |
| B  | F  | R  | E  | U  | I  | T  | N  |

Add or subtract.  
Use the code.

What do you learn?

|  |  |  |
|--|--|--|
| $\begin{array}{r} 34 \\ + 13 \\ \hline 47 \end{array}$ | $\begin{array}{r} 94 \\ - 10 \\ \hline 84 \end{array}$ | $\begin{array}{r} 24 \\ + 12 \\ \hline 36 \end{array}$ |
| T  | H  | E  |

|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
| $\begin{array}{r} 35 \\ + 61 \\ \hline 96 \end{array}$ | $\begin{array}{r} 88 \\ - 43 \\ \hline 45 \end{array}$ | $\begin{array}{r} 41 \\ + 12 \\ \hline 53 \end{array}$ | $\begin{array}{r} 36 \\ + 42 \\ \hline 78 \end{array}$ | $\begin{array}{r} 98 \\ - 35 \\ \hline 63 \end{array}$ | $\begin{array}{r} 15 \\ + 42 \\ \hline 57 \end{array}$ | $\begin{array}{r} 79 \\ - 41 \\ \hline 38 \end{array}$ | $\begin{array}{r} 13 \\ + 12 \\ \hline 25 \end{array}$ |
| D  | I  | N  | O  | S  | A  | U  | R  |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| $\begin{array}{r} 78 \\ - 21 \\ \hline 57 \end{array}$ | $\begin{array}{r} 67 \\ - 57 \\ \hline 10 \end{array}$ | $\begin{array}{r} 13 \\ + 23 \\ \hline 36 \end{array}$ | $\begin{array}{r} 20 \\ + 37 \\ \hline 57 \end{array}$ | $\begin{array}{r} 77 \\ - 14 \\ \hline 63 \end{array}$ | $\begin{array}{r} 69 \\ - 22 \\ \hline 47 \end{array}$ |
| A  | B  | E  | A  | S  | T  |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| $\begin{array}{r} 50 \\ + 28 \\ \hline 78 \end{array}$ | $\begin{array}{r} 37 \\ - 25 \\ \hline 12 \end{array}$ | $\begin{array}{r} 50 \\ + 40 \\ \hline 90 \end{array}$ | $\begin{array}{r} 89 \\ - 11 \\ \hline 78 \end{array}$ | $\begin{array}{r} 69 \\ - 44 \\ \hline 25 \end{array}$ | $\begin{array}{r} 98 \\ - 62 \\ \hline 36 \end{array}$ |
| O  | F  | Y  | O  | R  | E  |



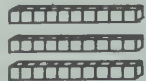

214 (two hundred fourteen)

Addition and subtraction practice: sums and minuends to 99

## LESSON ACTIVITY

### Before Using the Page

• Begin with a review of addition with no regrouping. Use models of tens and ones on the overhead projector to present pairs of addends. Review that the ones are joined first and then the tens are joined. For each example, have the children complete the corresponding addition exercise.

| tens  | ones  |
|---|---|
|  |  |
|  |  |

$$\begin{array}{r} 23 \\ + 34 \\ \hline \end{array}$$

• Adapt the preceding activity for reviewing subtraction with no regrouping.

### Using the Page

• Some children may recognize that this page and the following one involve a code. If possible, have children explain the procedure that is used to complete page 214. Draw attention to the fact that the code extends across the top of pages 214 and 215, and that the entire message will not be known until page 215 is completed. Note that the work of page 215 involves addition and subtraction with regrouping, whereas the exercises on page 214 do not involve regrouping.

• Discuss the three completed exercises and have the children explain why the letters T, H, and E were chosen from the code. Name several other numbers from the code and have children state the letter associated with each number. Have the children trace over the dotted numerals and letters for the completed exercises and then let them continue on their own. You may wish to have them complete all the addition and subtraction exercises before they write the letter associated with each answer.

• After the children have completed the page, help them to read the words. Explain the meaning of the word *yore* (long ago).

**OBJECTIVE**

Add and subtract two-digit numbers, regrouping, sums and minuends to 99

**Materials**

models for tens and ones, overhead projector

**RELATED ACTIVITIES**

• This page may be used to determine how well the children have understood the concept of addition and subtraction of two-digit numbers with regrouping. On the basis of the results, prepare remedial work such as reviewing basic addition and subtraction facts having sums from 10 to 18, and working with objects for the regrouping of either ones as tens or tens as ones.

|    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|
| 57 | 62 | 63 | 64 | 72 | 78 | 84 | 90 | 96 |
| A  | L  | S  | V  | M  | O  | H  | Y  | D  |

|     |     |     |     |
|-----|-----|-----|-----|
| 48  | 97  | 17  | 90  |
| +48 | -19 | +19 | -27 |
| 96  | 78  | 36  | 63  |
| O   | O   | E   | S   |

|     |     |     |
|-----|-----|-----|
| 24  | 29  | 74  |
| +29 | +49 | -27 |
| 53  | 78  | 47  |
| N   | O   | T   |

|     |     |     |     |
|-----|-----|-----|-----|
| 36  | 94  | 81  | 52  |
| +26 | -49 | -17 | -16 |
| 62  | 45  | 64  | 36  |
| L   | I   | V   | E   |

|     |     |     |     |
|-----|-----|-----|-----|
| 39  | 9   | 9   | 74  |
| +45 | +27 | +16 | -38 |
| 84  | 36  | 25  | 36  |
| H   | E   | R   | E   |

|     |     |     |
|-----|-----|-----|
| 83  | 81  | 54  |
| -26 | -28 | +36 |
| 57  | 53  | 90  |
| A   | N   | Y   |



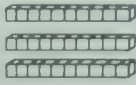

|     |     |     |     |
|-----|-----|-----|-----|
| 49  | 39  | 80  | 95  |
| +23 | +39 | -55 | -59 |
| 72  | 78  | 25  | 36  |
| M   | O   | R   | E   |

Addition and subtraction practice: sums and minuends to 99

(two hundred fifteen) 215

**LESSON ACTIVITY****Before Using the Page**

• Review addition with regrouping. Use models for tens and ones on the overhead projector to present pairs of addends. Review that the ones are joined first, that 10 ones are regrouped as another ten, and then the tens are joined. For each example, have the children complete the corresponding addition exercise.

| tens  | ones  |
|---|---|
|  |  |
|  |  |

$$\begin{array}{r} 28 \\ + 35 \\ \hline \end{array}$$

• Adapt the preceding activity for reviewing subtraction with regrouping.

**Using the Page**

• Remind the children that this page is a continuation of the work of page 214, and that the code extends across the top of pages 214 and 215. Review the procedure for decoding the words and caution the children to observe the symbol indicating the operation required. Then let them work independently.

• After the children have completed the page, help them to read the whole poem, which begins on page 214. You may wish to discuss that the words *more* and *yore* rhyme, as this helps to explain the poet's choice of the word *yore*, which is not in common use today. If you wish, read the poem several times and have the children clap in time to the rhythm of the words. They may suggest singing the words to a simple melody.



## OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

## Materials

demonstration clock, models for hundreds, tens, and ones, flip chart for each child



## RELATED ACTIVITIES

- You may wish to have the children play the game "Time Bingo". Each child has a game board showing six clock faces marked with times, some to a five-minute mark. There is a "call card" to match the time shown on each clock face. Each player has six markers to cover the clock faces. The leader displays a "call card" and players having a clock face showing that time may cover it with a marker. The player who first has six markers on the game board is the winner.

Complete.

|  |  |  |   |   |  |
|--|--|--|---|---|--|
| $\begin{array}{r} 69 \\ + 24 \\ \hline 93 \end{array}$ | $\begin{array}{r} 37 \\ + 25 \\ \hline 62 \end{array}$   | $\begin{array}{r} 48 \\ + 36 \\ \hline 84 \end{array}$   | $\begin{array}{r} 14 \\ + 19 \\ \hline 33 \end{array}$    | $\begin{array}{r} 27 \\ + 33 \\ \hline 60 \end{array}$    | $\begin{array}{r} 84 \\ + 7 \\ \hline 91 \end{array}$    |
| $\begin{array}{r} 19 \\ - 19 \\ \hline 0 \end{array}$  | $\begin{array}{r} 56010 \\ - 54 \\ \hline 6 \end{array}$ | $\begin{array}{r} 12212 \\ - 16 \\ \hline 6 \end{array}$ | $\begin{array}{r} 78111 \\ - 27 \\ \hline 54 \end{array}$ | $\begin{array}{r} 45212 \\ - 35 \\ \hline 17 \end{array}$ | $\begin{array}{r} 34313 \\ - 39 \\ \hline 4 \end{array}$ |

How many?

|   |   |    |    |    |    |    |    |    |    |
|---|---|----|----|----|----|----|----|----|----|
|  | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|  | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |

Write the time shown.

Complete.

5 hundreds 7 tens 0 ones 570

7 hundreds 0 tens 8 ones 708

126 means 1 hundreds 2 tens 6 ones

492 means 4 hundreds 9 tens 2 ones

396 397 398 399 400 401 402 403

495 496 497 498 499 500 501 502

1 dollar and 23 cents \$1 23



Can you flip the red shape to fit the blue shape?



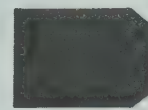
Yes

No



Yes

No



Yes

No

216 (two hundred sixteen)

CHECKUP

## LESSON ACTIVITY

### Before Using the Page

- Review some of the concepts presented in this unit by selecting from the following activities:
  - Write exercises on the chalkboard to review addition and subtraction of two-digit numbers with regrouping. Have the children check the answers to the subtraction exercises by writing and completing the corresponding addition exercises.
  - Have the children count by fives to 60. Show times at the five-minute marks on the demonstration clock and have children state each time shown.
  - Use models of hundreds, tens, and ones to represent numbers to 999. Have children identify the numbers represented. Then have the children start at a given number on their flip charts and count on for a short interval. Repeat for other numbers. Have them state the number of hundreds, tens, and ones.
  - You may wish to prepare the odometer device described on page T275 for demonstrating and reviewing three-place numerals.

### Using the Page

- Direct the children's attention to the word *Checkup* at the bottom of the page. Review the purpose of this page. Read each instruction with the children to ensure that they know what they are to do. Let the children work independently while you help those who are having difficulty.

## Games and Activities

### Clock Walk (Game for page 205)

## Materials

a game board similar to the one shown below

15 cards showing numerals for times at five-minute marks and corresponding to the times shown on the clock faces on the game board

one regular die

a marker for each player

the dinosaur footprints should be marked with comments such as the following:

Good weather. Move ahead 2.

Lost in the forest. Go back 2.

Stuck in the mud. Miss a turn.

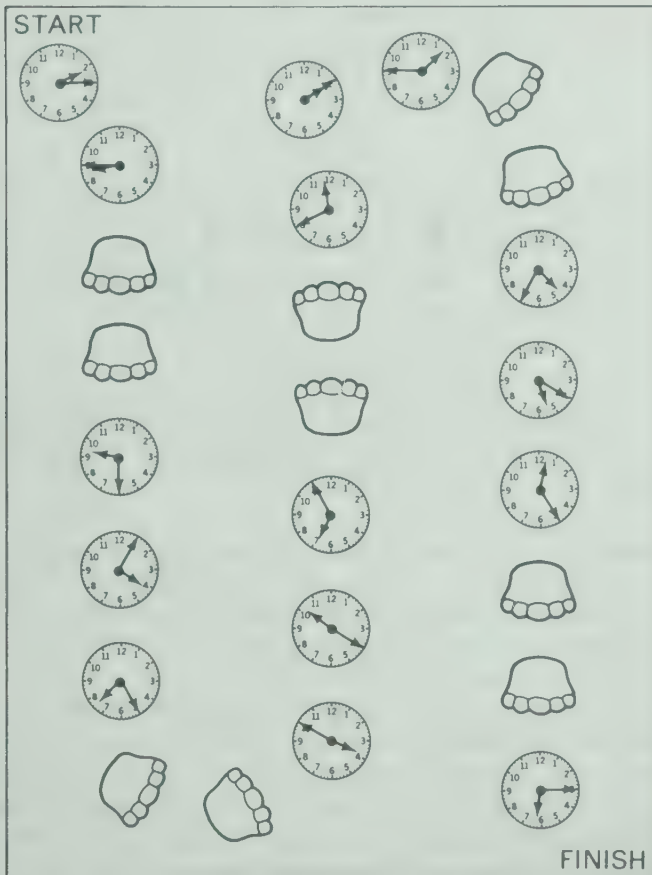
Too crowded here. Go back 3.

Hurt one foot. Miss a turn.

Stopped to eat. Miss a turn.

Chased by another dinosaur. Move ahead 2.

Forgot where you were going. Go back to start.



## Rules

1. The players take turns throwing the die and moving their markers.
2. When landing on a clock face, the player must find the card that matches the time on the clock face.
3. If the matching is correct, the player scores a point. If it is incorrect, the player must move the marker back to the nearest footprint and wait for the next turn.
4. After all the players reach the last clock face, the player having the most points is the winner. If preferred, the winner may be the player who first reaches the last clock face.

Dinosaur Ride (Game for page 207)

## Materials

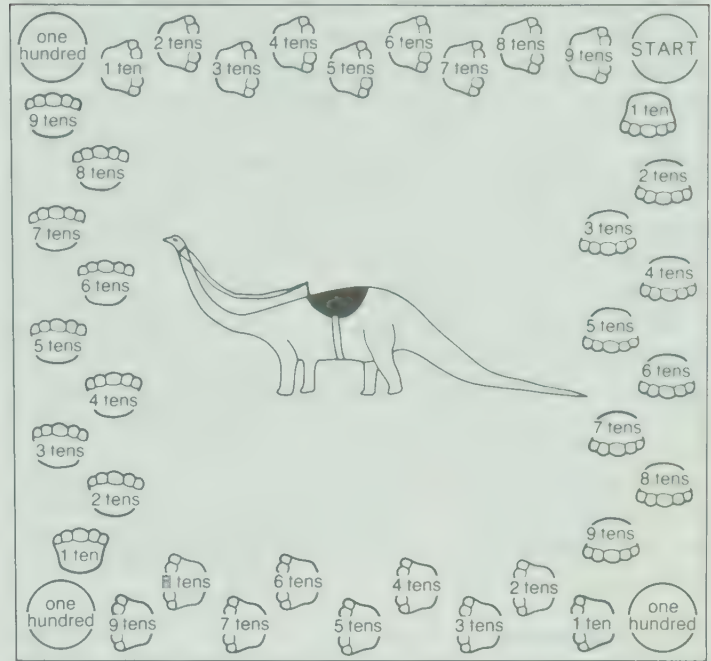
a game board similar to the one shown below

at least 50 beads or models for tens

at least 50 sticks or models for hundreds

one regular die

a different marker for each player



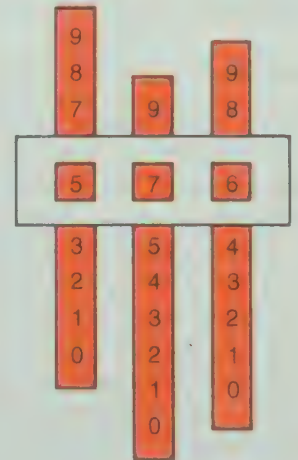
## Rules

1. From two to four players place their markers at the starting position.
2. The players take turns throwing the die. Each player moves her/his marker the number of steps indicated by the die and takes that number of tens.
3. When a player has collected ten tens, he/she can exchange them for one hundred.
4. The player who first collects nine hundreds wins a ride on the dinosaur.

## Odometer Device for page 216

Use a cardboard frame and three strips of cardboard. Cut slits in the frame as shown. Write the numerals 0 to 9 on each strip and then insert the strips through the slits. Move the strips up or down to show three-place numerals.

If the ends of each strip are left blank, the strip can be bent and the ends joined to form a loop that can be turned. This device resembles an odometer. Smaller versions can be made for children to use in responding to directions such as, "Show 439. Show the number that is one greater than 439. Show 290. Show the number that is one less than 290."





## Unit 11 Overview

This unit includes a preliminary look at the operation of multiplication. Illustrations showing sets of two, five, and ten objects provide a meaningful presentation of the new operation and its relationship to repeated addition of the same number. The symbol  $\times$  and its interpretation, *times*, are carefully introduced in the lessons. Number lines are also used to represent multiplication as jumps of 2, 5, and 10 units and to focus attention upon multiples of these numbers. Simple illustrated word problems are presented for children to apply the new operation. One lesson provides experiences in sharing by separating given sets of objects into two or three groups. The concept of *volume* is approached in terms of how many cubes are used to make regular and irregular solid shapes. An interval of one minute is related to the length of time required to perform various everyday activities. Further experiences with money are included in which the children find two items that together have a value of one dollar; several methods of doing so are suggested in *Before Using the Page* for this lesson. Exercises are provided to review slides, flips, and turns of shapes and to maintain skills in addition and subtraction of two-digit numbers. The *Checkup* at the end of the unit provides an evaluation of the concepts and skills covered in the lessons.

### Unit Outcomes

#### Number

- complete sentences related to repeated sets of two
- recognize the symbol  $\times$  and interpret its meaning
- complete multiplication facts of 2, to  $9 \times 2$
- make sets of two for an even number, to 18
- complete sentences for multiplication facts of 10, to  $9 \times 10$
- complete sentences for multiplication facts of 5, to  $9 \times 5$
- solve problems involving multiplication facts of 2, 5, and 10
- add and subtract two-digit numbers, no regrouping and regrouping, sums and minuends to 99
- determine two amounts of money equivalent to one dollar
- share to show equal parts of a set

#### Measurement

- count the units of volume in a shape
- estimate an interval of one minute

#### Geometry

- identify slides, turns, and flips

#### Background

**Number:** Multiplication concepts and facts of two, five, and ten are presented in *Starting Points in Mathematics 2*, but whether they should be included in the second-year program is a decision that the teacher must make. Among several considerations affecting the decision are the abilities and the achievements of the children, as well as the scope of the second-year mathematics program outlined in the curriculum for the particular school or educational system.

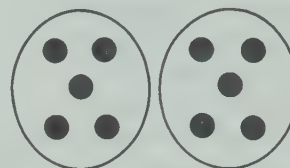
Multiplication is approached through the operation of addition with which the children have had considerable experience. Repeated addition of the same number can be related to multiplication of that number. If the foundation for counting by twos,

fives, and tens has been established, the multiples of these numbers may be well known. Some children probably know a number of basic multiplication facts involving these numbers and only need to learn the appropriate vocabulary and symbols in order to express them.

Sets are used in the early stages as the vocabulary and symbols are carefully introduced. In the corresponding multiplication sentences the symbol  $\times$  is read only as “times”. The first factor in a multiplication sentence represents the number of sets and the second factor represents the size of each set. In A these features are illustrated for  $2 \times 5 = 10$ . In B the multiplication sentence  $5 \times 2 = 10$  is read “Five times two equals ten” and relates to five sets with two objects in each set.

A

2 sets of 5



2 fives are 10  
2 times 5 equals 10  
 $2 \times 5 = 10$

B

5 sets of 2



$5 \times 2 = 10$

It should be noted that the  $\times$  symbol is not read “multiplied by” since this would indicate the opposite with respect to the number of sets and the size of each set.

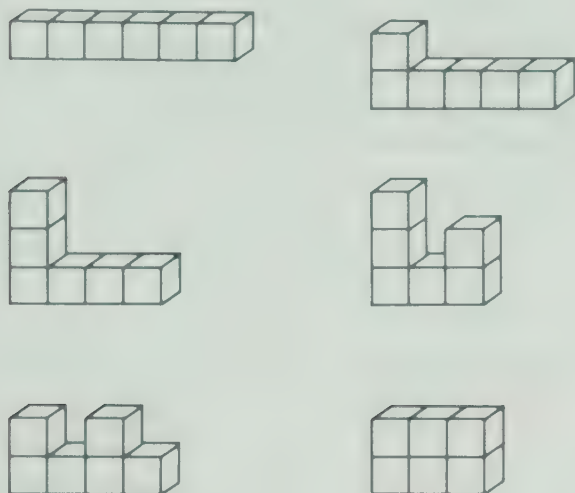
Zero as a factor is met in  $0 \times 2$ ,  $0 \times 5$ , and  $0 \times 10$ , and the children should probably be ready to generalize that the result is zero if the number of sets is zero. Examples from real life will give meaning to multiplication sentences in which zero is the first factor, for example, no pairs of slippers ( $0 \times 2$ ), no nickels ( $0 \times 5$ ), no dimes ( $0 \times 10$ ).

Basic facts in multiplication have only one-digit factors and therefore the number of sets is taken only as far as nine. It is not beyond the abilities of the children to consider the three facts  $10 \times 2 = 20$ ,  $10 \times 5 = 50$ , and  $10 \times 10 = 100$ , and these may be included if desired. It is just that they are not “basic facts” according to the definition of the term.

The development of multiplication can include incidental discussion such as “How many twos are eight?” or “How many fives are thirty?” These, of course, hint at the related division concepts, but formal presentation of this operation is deferred until Book 3 of this series.

Sharing is the earliest experience with the concept of division. For example, if twelve cookies are shared equally among three children, each child receives four cookies. The corresponding division sentence is  $12 \div 3 = 4$ . The quotient, 4, tells the number in each of the three groups. At this time children are involved in sharing objects but are not introduced to the formal terms or symbols associated with division.

**Measurement:** Solids occupy space, some more and some less. To describe the sizes of solids and to compare their sizes, cubes are used as units of volume. No formal methods of calculating the number of cubes are needed for children to acquire meaningful concepts concerning volume. By manipulating and counting the cubes they can determine the volume of a solid. They can also discover that solids having the same volume do not always have the same shape. Each of the shapes shown has a volume of six cubic units.



A common statement in everyday life is "Wait a minute", but few people have a clear idea of the length of one minute. Skills in estimating an interval of time can be developed only through experience. Even the nature of the ongoing activity during a period of time can influence one's judgment about its length. Enjoyable circumstances tend to make intervals seem short, whereas boring and uninteresting events tend to make them seem long. Informal units to measure time can be developed by counting how many times certain acts can be repeated in one minute. By this means an intuitive feeling for one minute can be acquired.

### Teaching Strategies

If the multiplication topics in this unit are to be excluded from the second-year mathematics program, attention and effort should be directed to the children's mastery of basic addition and subtraction facts and to improvement in their skills using the two operations. Individual weaknesses can be carefully identified, followed by reteaching, review, and practice. Extra practice exercises may be made self-checking in nature since the use of addition to check subtraction was introduced in the previous unit. The inverse relationship may also be applied to check the addition of two numbers by subtracting one of the addends from their sum.

In connection with the multiplication facts, try to provide ample opportunity for children to work with objects to make from one to nine groups of objects for each of the numbers two, five, and ten. Following this concrete level of development, the number line is probably the most effective teaching-learning aid. Starting from zero, jumps 2 units, 5 units, and 10 units in length emphasize multiples of two, five, and ten. Zero jumps can also be understood if the children realize that zero means "no jumps", and therefore there is no movement along the number line.

The term *volume* usually suggests a solid or a region of space having a regular rectangular shape as in a brick or a carton. But this is a limited concept and the work on page 217 directs the children's consideration to other less regular shapes. Prior to the lesson, the children need opportunities to play and to build with cubes for several days. To prepare them for both the regular and irregular shapes the children might be challenged to build as many different shapes as possible from a given number of cubes. They would learn from firsthand experience that several different shapes can have the same volume.

The lesson on estimating an interval of one minute provides an opportunity for the entire class to share in a common experience that is not dependent on their progress in number concepts and skills. The children will probably enjoy making pendulums having different lengths and attached weights and making some interesting discoveries. Some children may be given the task of timing certain television commercials and reporting on those that last one minute. The children may also work in pairs and time each other while reading aloud for one minute and then determine the number of lines read. The activities suggested here and in the teaching suggestions on page T297 are attempts to capture one minute in terms of familiar activities.

### Materials

- cubes, boxes of different sizes
- blocks or other objects
- counters for each child
- chart paper
- number line, a work sheet of ten number lines prepared from copies of page T331 for each child
- Unifix cubes
- objects for grouping by tens
- a copy of a number line marked in tens to 90 for each child
- demonstration number line
- a box of beads or other small objects, nine paper cups
- a copy of a number line marked in fives to 45 for each child
- various objects bundled in sets of two, five, and ten
- a special work sheet of problems involving multiplication
- a copy of the number chart on page T333 for each child
- real money, play money, or coin cutouts from copies of page T327
- envelopes, play store with pairs of items that together cost one dollar
- objects for sharing, set holders
- pins, cutouts of shapes, cutouts of shapes from copies of page T346 for each child
- string and a metal washer or nut to make a simple pendulum
- a clock with a second hand
- Bristol board for making boxes having the same volume
- activity cards for exploring the concept of volume
- cards for multiplication facts

### Vocabulary

|                    |                         |
|--------------------|-------------------------|
| unit cubes         | multiplication sentence |
| times ( $\times$ ) | second hand             |



## Unit 11 Theme – Pioneer Days

The purpose of this theme is to create an appreciation of the quality of life in pioneer times. The children should become aware of the hardships and toil that went into building the country that we enjoy today. It is hoped that they will be able to identify the changes in daily life between those early days and the present.

### LANGUAGE ACTIVITIES

#### 1. Discussing Pioneer Life

In conversation, we often hear references to “the olden days”. Ask the children to share their ideas about “the olden days”. You will likely hear of events ranging from several years ago to thousands of years ago.

Explain that “the olden days” you plan to discuss are the days of the early settlers or pioneers. These were the people who came to this country from other countries or who moved from settled areas to wilderness regions. Life was very lonely and difficult as they cleared the land and built their homes. Houses were built from trees that they cut down—some of these log cabins are still standing today. The log cabins were heated by a fireplace and the food was also cooked there. Food was grown by the settlers or gathered from the woods and fields. Meat was obtained by hunting or from animals that the settlers raised. Pioneer women made their own candles, soap, and bread. Wool from the sheep was spun on a spinning wheel into yarn for knitting or making cloth.

Make a chart showing two columns labelled “Then” and “Now”. Record information about pioneer life and similar information about life today so that the children can compare the two lifestyles. Ask the children to give reasons why they would like or not like to have been pioneers.

#### 2. Pioneer Schools

The early pioneers did not have schools so the children learned at home. As areas became more settled, small schools were built. These schools were often made of logs and had only one room. A stove in the middle of the room provided the heat. Often the children who sat nearest the stove were uncomfortably warm and those who sat farthest from the stove were uncomfortably cold.

The children went to school only two or three months of the year when there was not much work to be done on the farms. The children often walked a long way to the school, carrying their lunches of cold meat and dry bread in knapsacks or pails.

Since books were very scarce, the children worked on slates and wrote with another piece of slate or a piece of chalk. If paper was available, older children used ink made from bark or berries and wrote with sharpened quills from the wing feathers of a goose. Often the only aids that a teacher had were a chalkboard and a map of the world. Lessons consisted of writing, reading, spelling, and arithmetic. Information was often presented in rhyme to help in remembering facts. The rhyme “Thirty days hath September . . .” is one such example.

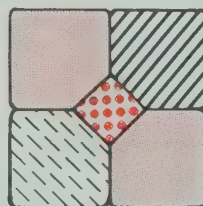
Set up a pioneer school display in the classroom. Small slates can be purchased at department stores and goose or duck feathers can be obtained from local farmers. Reprints of early textbooks are available at bookstores. Allow small groups of children to do their work in the pioneer school.

### MATHEMATICS ACTIVITIES

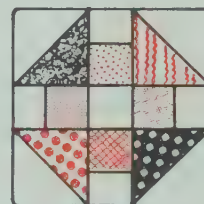
#### 1. Symmetry in Quilt Patterns

Cloth was not easily available to the early settlers, so every scrap was carefully saved. Many of these scraps were used for making quilts. Some quilts were called “crazy quilts” because the scraps were sewn together at random. Many quilts, however, were made in blocks having the same pattern or design. Each design was given a name and many of these traditional patterns are still used today. Although some patterns are as simple as others are intricate, they are almost all symmetrical.

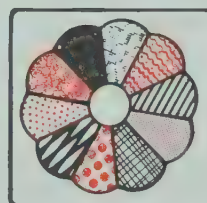
Show the children some traditional quilt patterns and have them indicate the line(s) of symmetry. The book *Once Upon a Quilt: Patchwork Design and Technique* by Celine Blanchard Mahler, published by Van Nostrand Reinhold Company in 1973, is an excellent reference for these patterns. Four popular patterns are shown below.



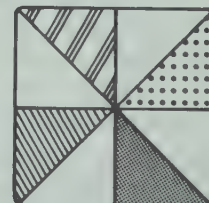
Bowtie



Wrench



Dresden plate



Windmill

Give the children copies of page T344 and have them design their own block patterns, using colored pencils or crayons. Remind them that the pattern must consist of geometric shapes and be symmetrical.

### SCIENCE ACTIVITIES

#### 1. Food in Pioneer Times

The pioneer family depended on its garden for fruits and vegetables all year round. In summer, produce was eaten fresh, but it had to be stored or preserved for the winter months. Discuss the following four methods of food preservation with the children. Compare the pioneer methods of preserving food with the modern techniques used today. If possible, try at least one of the pioneer methods in the classroom.

##### *Cold Storage*

Many fruits and vegetables, such as apples, potatoes, carrots, squash, and pumpkins, could be stored in pits during the winter months. A shallow circular hole was dug in the ground. Then the vegetables were heaped in the centre of the pit and covered with a thick layer of straw. This mound was then covered with a thick layer of soil. These pits made it possible to keep fruits and vegetables fresh all winter.



### *Drying*

Fruits and vegetables were often cut into thin strips and then strung together and hung from the rafters of a building to dry. When water was added, the food would regain its original appearance. The pioneers called green beans "little britches" when they were strung together and dried in this way. They also used this method for drying apples, plums, and mushrooms. Meat was sliced into strips and allowed to dry in the sun. Other strips of meat were smoked over a fire. This dried or smoked meat was then stored for use in the winter months.

### *Salting*

This was a popular method for preserving meat or fish. The meat or fish was stored in crocks between layers of salt. When it was to be used, the meat was soaked in fresh water overnight to remove the excess salt. The meat could then be boiled, fried, or roasted.

### *Pickling*

This method was used for both meat and vegetables. A solution called *brine* was made of salt, vinegar, and water and poured over the food in a crock. A plate or other heavy object was used to keep the food covered with the brine. Onions, beets, or cabbage could be stored this way in crocks. Today, we prepare cabbage in a similar way and call it *sauerkraut*.

## **2. Pioneer Treats**

As food supplies decreased and because the methods of preserving foods and cooking them were limited, pioneer meals did not offer the variety of foods we have today. Still, pioneer children enjoyed treats just as children do today. Sample some of these treats in your classroom.

### *Nuts*

In the fall, the children gathered walnuts or beechnuts. These were stored and later cracked on winter evenings. Sometimes the nutmeats were used in special cakes or cookies.

### *Seeds*

Sunflower, pumpkin, and squash seeds were all saved for special treats. They were washed and dried, then toasted with a small amount of grease and salt. You can make this treat at school by combining pumpkin seeds or squash seeds with two tablespoons of cooking oil and a sprinkle of salt. Spread the seeds on a baking sheet and place it in a warm oven for about half an hour. Stir the seeds several times for uniform toasting.

## **3. Baking Bread**

The smell and the taste of homemade bread makes the time and the effort of making it worthwhile. The pioneer homemaker made bread several times a week, every week of the year. She also churned the butter to spread on the bread.

The experience of making bread is rewarding and enjoyable. Plan the experience with the children by gathering the equipment and materials. Use an easy recipe and start early in the morning so that you may have your tasting party in the afternoon. Have the children compare their bread with the bread from a supermarket.

## **4. Making Butter**

To enjoy the taste of homemade bread you will need some fresh butter to spread on the slices. Butter can be made quite simply in a covered jar.

To make enough butter for your class you will need about three cups of thick whipping cream. Keep the cream chilled until you are ready to start the "churning".

Obtain a large jar with a cover that can be screwed on tightly. A large jar that contained peanut butter would be of a suitable size. Wash and rinse the jar well and then scald it and the cover. Follow this by rinsing them in very cold water.

Pour the chilled cream into the jar and screw the cover on tightly. Shake the jar for about one minute; unscrew the cover and let the gas escape; then replace the cover. Let the children take turns shaking the jar.

After about 15 or 20 minutes small particles of butter will begin to appear. Continue shaking until no more butter seems to be forming. Pour the mixture into a strainer, discarding the liquid. Place the butter in a bowl and cover it with cold water. Stir well, then strain off and discard the water. Wash the butter in this way until the water is no longer milky.

Now use the back of a wooden spoon to press the butter against the bowl, squeezing out as much water as possible. After the water has been poured off, sprinkle a pinch of salt over the butter and work the salt into the butter with the wooden spoon. Shape the butter to form a pat. Chill the butter until the bread is ready to be eaten.

Don't be alarmed if the butter looks like lard. Color is needed to make butter more appealing in appearance. The next time you make butter you can add a drop of yellow food coloring.

## **SOCIAL STUDIES ACTIVITIES**

### **1. Pioneer Communities**

To the pioneers the church was the focus of the community. At first, church services were held in houses of the settlers until a church could be built. A minister or a priest did not usually live in the community but travelled from one community to another, performing marriages, baptizing children, and celebrating communion or mass. Many times he served as the schoolmaster as well. If a schoolmaster did live in the community, the children of the settlers gathered at his home for their lessons until a school was built.

As the community grew, in addition to the homes, the church, and the school, other buildings were required to fulfil the needs of the community. Some of these buildings would be

- a general store
- a post office
- a flour mill
- a slaughter house
- a blacksmith shop
- a harness shop
- a boot and shoe shop

Discuss with the children the purpose of each of these establishments and why it was needed. Ask the children to think of other services that would be needed in the pioneer community. Discuss which of the services would not be found in a modern community and why not. Discuss what services there are in your community that would not be found in a pioneer community.

Have the children make a plan of a pioneer community. Guide them in deciding how the buildings should be located in relation to one another. After the children have decided on a suitable layout for the community, have them build a model of the pioneer community.

For the models of the buildings that the children plan to include, wooden blocks, small boxes, and milk cartons can be used. Masking tape will fasten paper to the sides of each building. The children can draw or paint on these paper walls to give



the effect of logs or rough hewn boards. Other features such as windows and doors should be shown.

The completed models can be placed on a large piece of mural paper on the floor. Have the children include other details such as wells, farm animals, fences, trees, and gardens.

## 2. Pioneer Transportation

Review the information about the covered wagon on page T167 of the theme for Unit 7, and then read the following poem.

### SONG OF THE CONESTOGA WAGON

This is my story . . . this is my sound:  
Four good wheels going round and round.  
Brave, bold pioneers marching along —  
To my rumbling wheels and rollicking song.  
Climbing the mountain, crossing the plain.  
Pressing along in sunshine or rain . . .  
Bleached bones, Indians, desert sand —  
Can't keep us from the Promised Land.  
Four good wheels, sturdy and strong —  
Bold, brave pioneers . . . singing along!

*Vilet*

Discuss the poem and ask questions similar to the following:

“Which words describe the sounds made by the wagon?”

“Which words describe the pioneers?”

“Which words indicate the difficulty of the trip?”

When the pioneers were settled, the canvas tops were removed and the wagons were used for hauling supplies and for family transportation. When better roads were built, many families had buggies pulled by their horses for visiting and travelling.

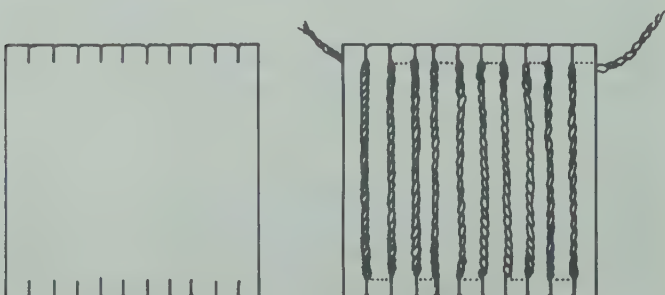
## ART ACTIVITIES

### 1. Quilted Potholders

Select some of the quilt block patterns that the children have designed. Make cardboard patterns of the necessary shapes. Cut shapes from scraps of fabric and stitch them together with short running stitches. The finished block should be about 20 cm square. Cut a backing of the same size from plain fabric. Place the right sides together and stitch around three edges. Turn the potholder to the right side and fill it with a layer of cotton batting. Close the fourth edge and quilt the potholder by using short straight stitches, running diagonally across the potholder.

### 2. Simple Weaving

The early settlers often had looms for making their own cloth. Make a simple loom by starting with a piece of thick cardboard, such as millboard, measuring about 22 cm square. Make slashes in each end 2 cm apart and 2 cm deep. Wrap fairly heavy yarn vertically from one slash to the next.



Using a contrasting colored yarn, weave in and out of the vertical strands, pushing each row close to the next. To finish a row simply weave the yarn over and under several strands and leave the end on the underside. Begin with a new color at the edge. When the weaving has been completed, cut each strand from the slash and tie a knot. This will leave a fringe at opposite ends.

## MOVEMENT ACTIVITIES

### 1. Puss in a Corner

This is one of the games that pioneer children played. The children stood in various locations that could be well-defined in a room, for example, at a corner of a table, by a chair, in front of a door, by a fireplace. The child who was chosen to be PUSS went from one child to another saying, “PUSS wants a corner.” The child addressed said, “Ask my neighbor.” The other children tried to exchange “corners” when PUSS was not looking. If PUSS was able to find a “corner”, then the child without a “corner” became PUSS.

Have the children play the game in a suitable room or in the gym if suitable objects can be placed to serve as “corners”.

### 2. Ploughing Match

One of the earliest ploughs that pioneers used had a metal share to cut through the sod and two handles by which the ploughman guided the metal share and turned the sod to form a straight furrow.

To give the children a feeling for the difficulty of guiding such a plough, form teams consisting of four or five pairs of children. Have the teams line up behind a starting line. Each pair forms a “plough” and a “ploughman” by one child getting down on all fours while the partner grasps her/his ankles, raising the feet and legs off the floor. As the first child moves forward on her/his hands, the second child supports the first child’s legs.

When the signal “Go!” is given, the first “ploughman” and “plough” in each team set out toward the finishing line and return, touching off the next “plough”. This sequence continues until all the “ploughs” in one team have covered the course. The team that finishes first is the winner.

## MUSIC ACTIVITIES

### 1. Folk Dancing

When the early settlers gathered together for visiting, the “get together” often ended with dancing. This dancing was done in groups of eight and was called *square dancing*, or with large groups of partners in dances called *reels*. Usually, there was a caller who directed the steps of the dance. The “Virginia Reel” is an easy and suitable dance for young children. The music is available on a record and will give the children an enjoyable experience in folk dancing.

### 2. Canadian Folk Songs

While the pioneers carried out their strenuous work, they often sang songs to ease the monotony of their tasks. Acquaint the children with some of these songs, either through records or by inviting a musician to visit the classroom and to sing some of the songs. You may wish to make selections from copies of *Folk Songs of Canada* by Edith Fowke and *Canadian Folk Songs for the Young* by Barbara Cass-Beggs, if they are available in your public library.

Make these buildings with cubes.  
How many cubes are in each?

# Unit 11

## LESSON OUTCOME

Count the units of volume in a shape

### Materials

blocks, cubes, boxes of different sizes,  
special work sheets

### Vocabulary

unit cubes

## RELATED ACTIVITIES

- Have children use plans similar to the following to build shapes and count the cubes used. Then have them add more blocks to the shapes to form rectangular prisms and state the number of cubes used to complete each shape. You may wish to have them write and complete the corresponding addition sentences.

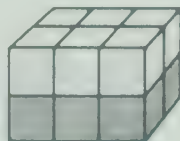
|   |   |   |
|---|---|---|
| 2 | 1 | 3 |
|---|---|---|

|   |   |   |
|---|---|---|
| 4 | 2 | 0 |
| 3 | 3 | 2 |

|   |   |   |
|---|---|---|
| 2 | 5 | 1 |
| 3 | 2 | 3 |
| 4 | 0 | 5 |



6



12



18



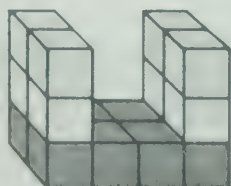
24



12



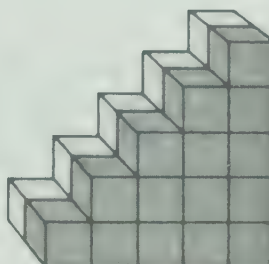
16



16



10



30

Counting units of volume

(two hundred seventeen) 217

## LESSON ACTIVITY

### Before Using the Page

- As a foundation for the concept of volume, children should have many opportunities for creative exploration with blocks, including the building of structures and using blocks to fill boxes of different sizes. Encourage children to bring boxes from home for this purpose.

Have the children use unit cubes to fill boxes of different sizes and then count the cubes used for each box. Label the boxes with letters to make the recording of results easier.

- Ask the children to state which of two boxes they think holds more cubes. Then have them check by filling each box with unit cubes and record the results.
- Have children build a shape with cubes and then tell how many cubes were used to build the shape.
- Have children build shapes by stacking cubes according to plans similar to the following. After each shape has been completed, have the children find the total number of cubes used.



|   |   |   |
|---|---|---|
| 1 | 2 | 3 |
|---|---|---|

|    |   |   |   |
|----|---|---|---|
| 10 | 9 | 8 | 7 |
|----|---|---|---|

|   |   |   |   |
|---|---|---|---|
| 2 | 8 | 3 | 4 |
|---|---|---|---|

|   |   |   |
|---|---|---|
| 5 | 3 | 5 |
| 6 | 0 | 4 |

### Using the Page

- Discuss with the children what they are to do for this page. Have them build each shape (building) first to help determine the number of cubes used. Encourage children who feel they can determine the answers without making the shapes to use cubes to check their answers.



## LESSON OUTCOME

Complete sentences related to repeated sets of two

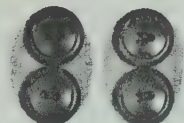
### Materials

counters for each child, chart paper, a sheet of paper for each child

## RELATED ACTIVITIES

- Prepare a work sheet showing even numbers of objects randomly placed. Have the children ring sets of two and write two sentences as on page 218.

Complete.



$$2 + 2 = \underline{4}$$



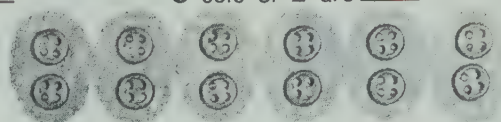
$$2 + 2 + 2 = \underline{6}$$

2 sets of 2 are 4



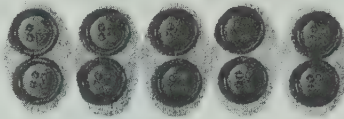
$$2 + 2 + 2 + 2 = \underline{8}$$

3 sets of 2 are 6



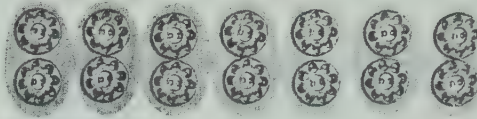
$$2 + 2 + 2 + 2 + 2 + 2 = \underline{12}$$

4 sets of 2 are 8



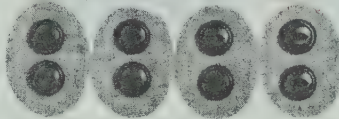
$$2 + 2 + 2 + 2 + 2 = \underline{10}$$

6 sets of 2 are 12



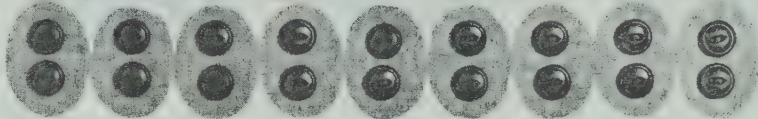
$$2 + 2 + 2 + 2 + 2 + 2 + 2 = \underline{14}$$

5 sets of 2 are 10

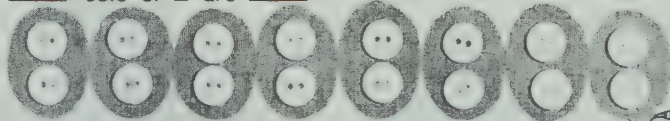


$$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = \underline{18}$$

7 sets of 2 are 14



9 sets of 2 are 18



$$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = \underline{16}$$

8 sets of 2 are 16



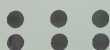
218 (two hundred eighteen)

Repeated addition using sets of 2

## LESSON ACTIVITY

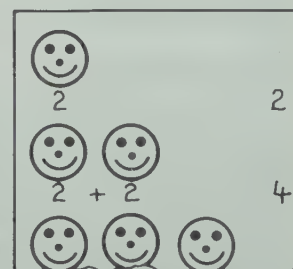
### Before Using the Page

- Ask one child to stand in front of the group. Say to the rest of the group, "One child. How many hands?" Ask the child to raise her/his hands to demonstrate the answer and then lower them. Ask a second child to stand beside the first child. Say, "Two children. How many hands?" Have the two children demonstrate. Continue in this manner until ten children are standing in the row. Begin by counting the hands by ones to 20. Stop and ask if there is a faster way to count the hands. Lead the children to suggest counting by twos. Start the counting again and have the children count by twos to 20. Ask children to suggest other things that come in twos.
- Have the children use their counters. Ask them to make a set of two counters, then another set of two, and a set of two again. Ask how many sets of two there are and how many counters there are in all. Draw diagrams on the chalkboard to illustrate. Write the two sentences shown.



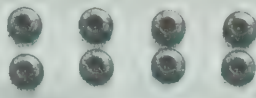
$$2 + 2 + 2 = 6 \quad 3 \text{ sets of } 2 \text{ are } 6$$

- On chart paper, develop diagrams for sets of eyes. Give a sheet of paper to each child and have them begin their own diagrams as you work on the large chart. Say, "One child. How many eyes? Two children. How many eyes?" Then have them continue on their own until they have drawn ten sets of eyes. After the children have finished this, ask them to write the numerals 1 to 20 at the bottom of the sheet and then to ring the numerals to show the number of eyes in sequence. Ask questions such as "Five children. How many eyes?" "Six eyes. How many children?"



### Using the Page

- Discuss the first exercise with the children and then let them work independently.



4 sets of 2    8 in all

We write  $4 \times 2 = 8$ 

We say "Four times two equals eight."

Complete each number sentence.

3 sets of 2

$3 \times 2 = \underline{6}$

1 set of 2

$\underline{1} \times 2 = \underline{2}$

0 sets of 2

$\underline{0} \times 2 = \underline{0}$

 $\underline{5}$  sets of 2

$\underline{5} \times 2 = \underline{10}$

 $\underline{4}$  sets of 2

$\underline{4} \times \underline{2} = \underline{8}$

 $\underline{6}$  sets of 2

$\underline{6} \times \underline{2} = \underline{12}$

 $\underline{8}$  sets of 2

$\underline{8} \times \underline{2} = \underline{16}$

Introduction to the word *times* and the sign  $\times$ 

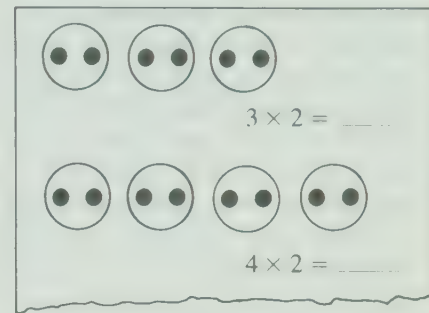
(two hundred nineteen) 219

**LESSON OUTCOME**Recognize the symbol  $\times$  and interpret its meaning**Materials**

blocks or other objects, a special work sheet

**Vocabulary**times ( $\times$ ), multiplication sentence**RELATED ACTIVITIES**

- Prepare a work sheet of exercises similar to the ones shown and have children complete the multiplication sentences.

**LESSON ACTIVITY****Before Using the Page**

- Display 12 blocks or similar objects. Have a child arrange them into sets of two. Ask what addition sentence will show how many blocks there are. Write  $2 + 2 + 2 + 2 + 2 + 2 = 12$  on the chalkboard. Ask what other sentence will show the number of blocks. Write "6 sets of two are 12" below the first sentence. Tell the children that there is another way, shorter than either of these ways, to show that there are six sets of two and 12 in all. Below the first two sentences, write  $6 \times 2 = 12$ . Point to the new symbol,  $\times$ , and explain that it is read "times". Read the sentence: "Six *times* two equals twelve."

Display 18 blocks. Have a child arrange them to show sets of two. Have some children write the three sentences, one under the other, on the chalkboard. Ask other children to read the third sentence: "Nine times two equals eighteen." Tell the children that this is called a *multiplication sentence*. Repeat the procedure for other sets of objects.

- Write the following two sentences on the chalkboard.

5 sets of 2 are \_\_\_\_

$\underline{\quad} \times \underline{\quad} = \underline{\quad}$

Have a child complete the first sentence. Ask the children what should be written in each of the blanks for the second sentence to show the short way of writing the first sentence. Have children complete the sentence on the chalkboard. Have a child read the sentence: "Five times two equals ten." Illustrate the multiplication sentence by drawing five sets of two on the chalkboard and having the children count by twos. Repeat for other sentences.

- Prepare a work sheet of exercises similar to the one shown and have the children complete them. You may also have them draw diagrams to illustrate each.

3 sets of 2 are \_\_\_\_

$\underline{\quad} \times \underline{\quad} = \underline{\quad}$

**Using the Page**

- Discuss the example at the top of the page and have children read the statements. Then let them work independently on the page. After they have completed the page, have children read the multiplication sentence for each exercise on the page.



## LESSON OUTCOME

Complete multiplication facts of 2, to  $9 \times 2$

### Materials

number line, work sheet of ten number lines prepared from copies of page T331 for each child

## RELATED ACTIVITIES

- After the children have completed the table at the bottom of the page, ask questions such as "How many wheels are there on two bicycles?" "For ten wheels, how many bicycles are there?"
- Have the children begin a book of multiplication facts beginning with multiplication facts of two. Have them write the basic facts from  $0 \times 2$  to  $9 \times 2$ . Later, multiplication facts of five and ten will be included in the book.
- Have the children complete the cross-number puzzle on page T299.

Start at 0 and jump by twos.  
Show nine jumps.



Complete each number sentence.  
Use the number line to help.

$$9 \times 2 = \underline{18}$$

$$6 \times 2 = \underline{12}$$

$$4 \times 2 = \underline{8}$$

$$7 \times 2 = \underline{14}$$

$$5 \times 2 = \underline{10}$$

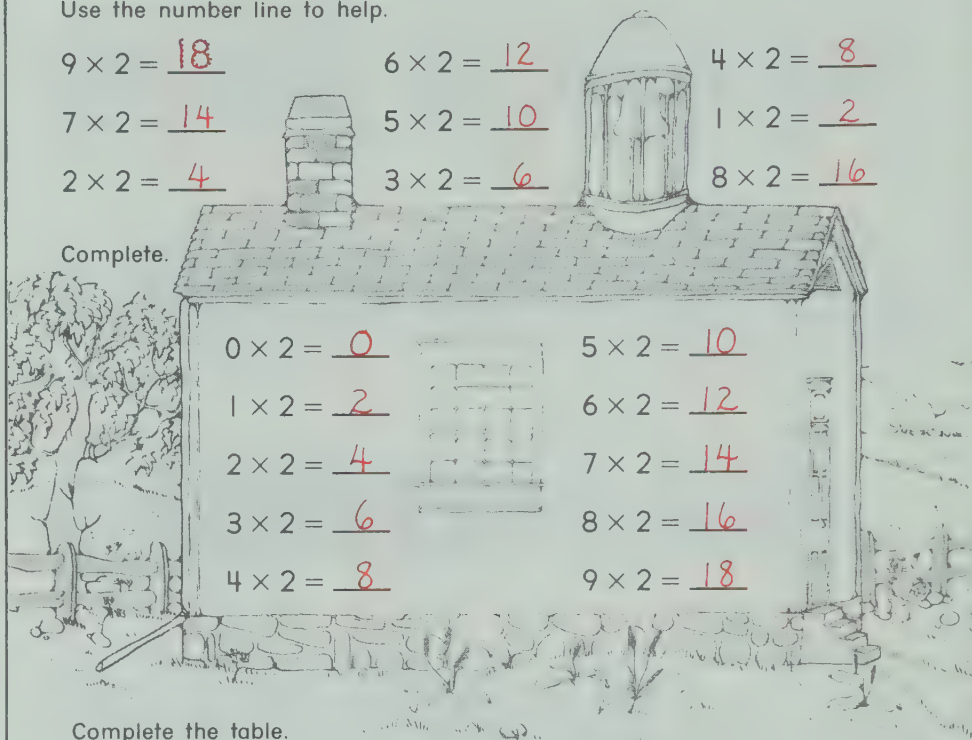
$$1 \times 2 = \underline{2}$$

$$2 \times 2 = \underline{4}$$

$$3 \times 2 = \underline{6}$$

$$8 \times 2 = \underline{16}$$

Complete.



$$0 \times 2 = \underline{0}$$

$$5 \times 2 = \underline{10}$$

$$1 \times 2 = \underline{2}$$

$$6 \times 2 = \underline{12}$$

$$2 \times 2 = \underline{4}$$

$$7 \times 2 = \underline{14}$$



$$3 \times 2 = \underline{6}$$

$$8 \times 2 = \underline{16}$$

$$4 \times 2 = \underline{8}$$

$$9 \times 2 = \underline{18}$$

Complete the table.

|   |          |          |          |          |           |           |           |           |           |
|---|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|
|  s | 1        | 2        | 3        | 4        | 5         | 6         | 7         | 8         | 9         |
|  s | <u>2</u> | <u>4</u> | <u>6</u> | <u>8</u> | <u>10</u> | <u>12</u> | <u>14</u> | <u>16</u> | <u>18</u> |

220 (two hundred twenty)

Multiplication facts of 2

## LESSON ACTIVITY



### Before Using the Page

- Review the meaning of the symbol  $\times$ . State a phrase, for example, five sets of two. Have a child write the corresponding multiplication phrase ( $5 \times 2$ ) on the chalkboard and read it. Have another child write the symbol  $=$  and complete the sentence. Use other examples.
- Have the children rote count by twos from 2 to 18. Then tell them that you would like to jump by twos on the number line, starting from zero. Write the sentence  $6 \times 2 = \underline{\quad}$  on the chalkboard. Ask how many jumps of two you should show on the number line for  $6 \times 2$ . Have the children count the jumps as you draw them. Ask, "What number did we reach?" Have a child complete the multiplication sentence on the chalkboard. Repeat for other examples, including  $1 \times 2$  (one jump of two) and  $0 \times 2$  (zero jumps of two). For  $0 \times 2$ , emphasize that the 0 means that no move is made.



- Prepare a work sheet showing ten number lines with corresponding sentences from  $0 \times 2 = \underline{\quad}$  to  $9 \times 2 = \underline{\quad}$ . Have the children illustrate each on a number line and complete the corresponding sentence. After the children have finished, ask questions of the two types: "How many jumps of two were needed to reach 18?" "How many jumps did you have to show for  $5 \times 2$ ?"

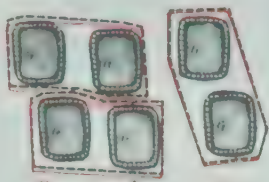
- On chart paper, prepare the following table comparing the number of dimes with the number of nickels. Have the children help to complete the table. Then ask questions such as "How many dimes have the same value as 2 nickels?" "How many nickels have the same value as 6 dimes?"

|   |   |   |   |   |
|---|---|---|---|---|
|  | 0 | 1 | 2 | 9 |
|  | 0 | 2 |   |   |

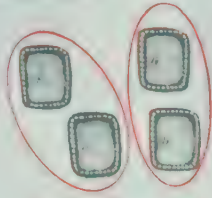
### Using the Page

- Read the instructions with the children. Have them show nine jumps of two on the number line. Ask what number is reached. Have the children complete the multiplication sentences using the number line for help, if necessary. Then have them complete the table at the bottom of the page.

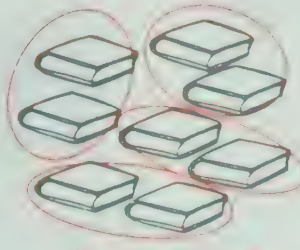
Ring to show sets of two.  
Complete each number sentence.



$$3 \times 2 = 6$$



$$2 \times 2 = 4$$



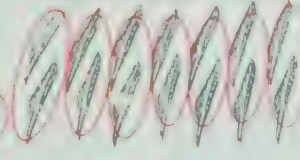
$$4 \times 2 = 8$$



$$6 \times 2 = 12$$

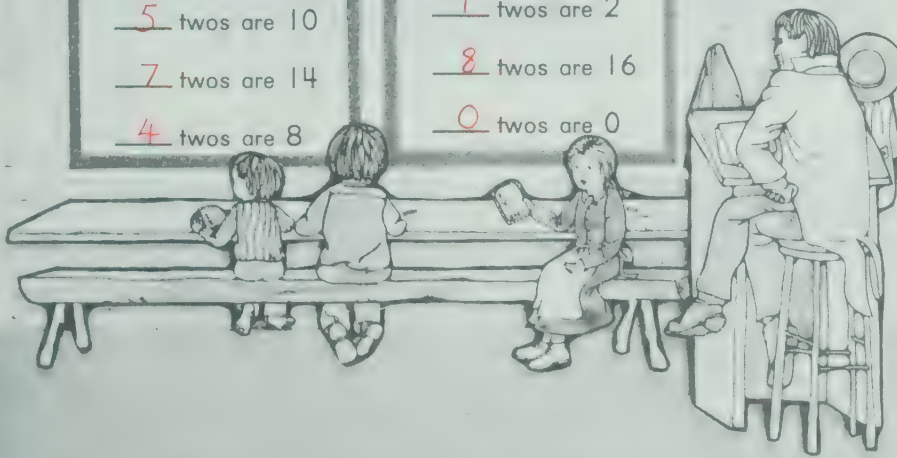
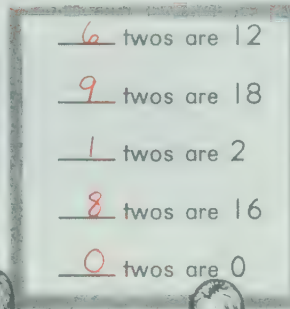
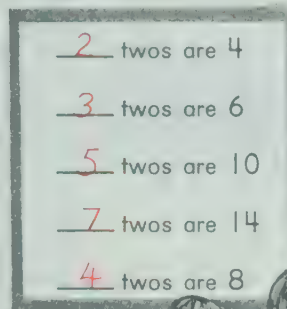


$$5 \times 2 = 10$$



$$7 \times 2 = 14$$

Complete.



Making sets of 2

(two hundred twenty-one) 221

## LESSON OUTCOME

Make sets of two for an even number, to 18

## Materials

Unifix cubes, counters for each child

## RELATED ACTIVITIES

• Give each child a copy of page T335 marked to show only one hundred squares. Have the children color the second square and every second square after that. Give each child another copy of page T335 and have the children color the first square and every second square after that. When they have finished their coloring, have them write the numerals on the colored squares to indicate which numbers on a hundred chart are associated with the colored squares.

Discuss the first chart. Ask, "What are the ones' digits for the numbers in the colored squares?" Discuss the second chart in a similar manner. Remind the children that numbers that have 0, 2, 4, 6, or 8 for the ones' digits are called *even* numbers, and those that have 1, 3, 5, 7, or 9 are called *odd* numbers.

Have children investigate the sum of two even numbers, the sum of two odd numbers, and the sum of one even and one odd number. (See page T189.)

## LESSON ACTIVITY

### Before Using the Page

- Join pairs of Unifix cubes together to form sets of two. Display three sets of two. Ask how many sets of two there are. Ask how we write "three sets of two". Write  $3 \times 2 = \underline{\quad}$  on the chalkboard. Have a child complete the sentence and read it. Display other sets of two and repeat the procedure.
- Display 16 single Unifix cubes and ask how many sets of two there are. Lead the children to suggest that they should first join pairs of cubes to form the sets of two and count them. Have children do this and write the appropriate multiplication sentence. Repeat the procedure for ten Unifix cubes.
- Have the children use 12 of their counters. Ask them to find out how many twos there are for 12. When they have determined the answer, have them say, "Six twos are twelve." Repeat the procedure for other numbers. Each time have the children say how many twos there are for that number and write the corresponding multiplication sentence.

### Using the Page

- Read the statements at the top of the page to the children. Discuss the first exercise and how they are to complete the statements for the second part of the page. They may use their counters if necessary.

After the children have completed the page, review the multiplication facts of two and encourage children to answer questions of the type: "How many twos are (8)?" without looking at the page. These questions will provide an incidental look at division.



## LESSON OUTCOME

Complete sentences for multiplication facts of 10

### Materials

objects for grouping by tens

## RELATED ACTIVITIES

- You may wish to have the children use a copy of page T335 marked to show only one hundred squares and color every tenth square. Afterward, the children may write the numerals 1 to 100 in the squares. Discuss the fact that the numerals in the colored squares all have 0 in the ones' place.
- You may wish to prepare a work sheet on which the children match phrases as indicated below.

|               |              |
|---------------|--------------|
| $5 \times 10$ | 2 sets of 10 |
| $8 \times 10$ | 5 sets of 10 |
| $2 \times 10$ | 7 sets of 10 |

Complete.



$$10 + 10 + 10$$

3 sets of 10

$$\underline{3} \times 10 = \underline{30}$$



$$10 + 10 + 10 + 10 + 10 + 10$$

6 sets of 10

$$\underline{6} \times 10 = \underline{60}$$



2 sets of 10

$$\underline{2} \times \underline{10} = \underline{20}$$



5 sets of 10

$$\underline{5} \times \underline{10} = \underline{50}$$



4 sets of 10

$$\underline{4} \times \underline{10} = \underline{40}$$



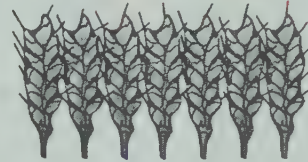
10 sets of 10

$$\underline{10} \times \underline{10} = \underline{100}$$



8 sets of 10

$$\underline{8} \times \underline{10} = \underline{80}$$



7 sets of 10

$$\underline{7} \times \underline{10} = \underline{70}$$

222 (two hundred twenty-two)

Multiplication facts of 10

## LESSON ACTIVITY

### Before Using the Page

- Have the children rote count by tens to 100. Display three groups of ten. Ask how many tens there are. Write the first sentence on the chalkboard. Have a child complete the sentence. Say, "Three sets of ten are thirty" and write the second sentence shown. Ask if anyone knows of a shorter way to write that three sets of ten are thirty. If necessary, remind the children of the symbol  $\times$ . Have a child write the third sentence shown and read it.

$$10 + 10 + 10 = \underline{\quad}$$

3 sets of 10 are 30

$$3 \times 10 = 30$$

Repeat the procedure for other sets of ten. Write the sentences and have children read each multiplication sentence.

- Write these two sentences on the chalkboard.

6 sets of 10 are         

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

Have the children use objects for grouping and display six sets

of ten and count by tens to determine how many there are. Have a child complete the first sentence on the chalkboard. Ask what numbers belong in the blanks for the second sentence. Have a child complete the sentence on the chalkboard. Have the children read the completed sentence: "Six times ten equals sixty."

- Write exercises similar to the following on the chalkboard or prepare a work sheet. Have the children complete the sentences.

3 sets of 10 are         

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

8 sets of 10 are         

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

4 sets of 10 are         

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

0 sets of 10 are         

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

### Using the Page

- Discuss with the children the first exercise and how the kernels on one head of wheat are meant to represent a group of ten. Then let the children work independently. After they have completed the page, have children describe each illustration and read the multiplication sentence; for example, "There are five sets of ten. Five times ten equals fifty."

## LESSON OUTCOME

Complete sentences for multiplication facts of 10, to  $9 \times 10$

### Materials

a copy of a number line marked in tens to 90 for each child, demonstration number line

### RELATED ACTIVITIES

- After the children have completed the table at the bottom of the page, ask questions such as "For 5 dollars, how many dimes are there?" "For 70 dimes, how many dollars are there?"
- Have the children make a page for multiplication facts of ten from  $0 \times 10$  to  $9 \times 10$  and include it in the book of facts suggested on page T284.

Start at 0 and jump by tens.  
Show nine jumps.

Complete each number sentence  
Use the number line to help.

$9 \times 10 = 90$      $4 \times 10 = 40$      $2 \times 10 = 20$   
 $5 \times 10 = 50$      $8 \times 10 = 80$      $1 \times 10 = 10$   
 $3 \times 10 = 30$      $6 \times 10 = 60$      $7 \times 10 = 70$

Complete.

$1$  ten is 10  
 $3$  tens are 30  
 $4$  tens are 40  
 $2$  tens are 20  
 $7$  tens are 70

$6$  tens are 60  
 $9$  tens are 90  
 $5$  tens are 50  
 $8$  tens are 80  
 $0$  tens are 0

Complete the table.

|           |    |    |    |    |    |    |    |    |    |
|-----------|----|----|----|----|----|----|----|----|----|
| CANADA \$ | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| ¢         | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |

Multiplication facts of \_\_\_\_\_ (two hundred twenty-three) 223

## LESSON ACTIVITY

### Before Using the Page

- Review sets of ten. State a number of tens, for example, three sets of ten. Have children count by tens and write the corresponding multiplication sentence ( $3 \times 10 = 30$ ). Have a child write the sentence on the chalkboard and read it. Use other examples.
- Have the children rote count by tens to 100. Then say that you would like to jump by tens on the number line, starting from zero. Write  $6 \times 10 =$  on the chalkboard. Ask how many jumps of ten you should show on the number line for  $6 \times 10$ . Have the children count the jumps as you draw them. Ask, "What number did we reach?" Have a child complete the multiplication sentence on the chalkboard. Repeat for other examples. For  $0 \times 10$  (zero jumps of ten), emphasize that no move is made from zero.
- Give each child a copy of a number line marked in tens to 90. Ask, "How many jumps of ten are needed to reach 40?" Have the children use their number lines to determine the answer.

Illustrate the jumps on the demonstration number line. Write the pair of sentences (4 tens are 40 and  $4 \times 10 = 40$ ) on the chalkboard. Repeat the procedure for other pairs of sentences. Have the children help to complete the sentences on the chalkboard.

- On chart paper, prepare the following table comparing the number of wagon wheels with the number of spokes. Have the children help to complete the table. Then ask questions such as "How many spokes are there for 5 wheels?" "How many wheels are there for 30 spokes?"

|  |   |    |   |   |
|--|---|----|---|---|
|  | 0 | 1  | 2 | 9 |
|  | 0 | 10 |   |   |

### Using the Page

- Read the instructions with the children. Have the children show nine jumps of ten on the number line. Ask what number is reached. Have the children complete the multiplication sentences using the number line for help, if necessary. Discuss how they are to complete the table at the bottom of the page.



## LESSON OUTCOME

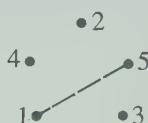
Complete sentences for multiplication facts of 5

### Materials

a box of beads or other small objects, nine paper cups

## RELATED ACTIVITIES

- You may wish to prepare a work sheet for fives similar to the one suggested in *Related Activities* on page T286.
- Prepare a dot-to-dot picture to enable children to practise making a five-pointed star. When they are able to draw the star on their own, have them make a chart as shown.



How many points?



5

5



5

5

10



Complete.

$$5 + 5$$

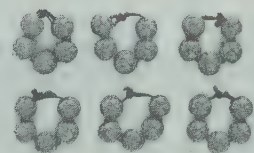
$$\underline{2} \text{ sets of } 5$$

$$\underline{2} \times 5 = \underline{10}$$



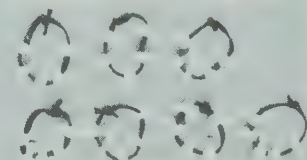
$$\underline{3} \text{ sets of } 5$$

$$\underline{3} \times \underline{5} = \underline{15}$$



$$\underline{6} \text{ sets of } 5$$

$$\underline{6} \times \underline{5} = \underline{30}$$



$$\underline{7} \text{ sets of } 5$$

$$\underline{7} \times \underline{5} = \underline{35}$$

$$5 + 5 + 5 + 5$$

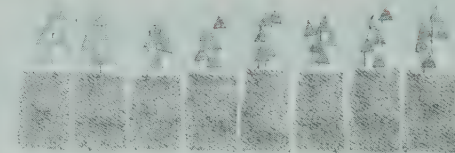
$$\underline{4} \text{ sets of } 5$$

$$\underline{4} \times 5 = \underline{20}$$



$$\underline{5} \text{ sets of } 5$$

$$\underline{5} \times \underline{5} = \underline{25}$$



$$\underline{8} \text{ sets of } 5$$

$$\underline{8} \times \underline{5} = \underline{40}$$



$$\underline{9} \text{ sets of } 5$$

$$\underline{9} \times \underline{5} = \underline{45}$$

224 (two hundred twenty-four)

Multiplication facts of 5

## LESSON ACTIVITY

### Before Using the Page

- Have the children rote count by fives to 50. Display a box of beads or other small objects and have nine paper cups available. Have each of three children, in turn, place five beads in a cup. Ask them to tell of a quick way to count how many beads there are in all. Lead them to suggest counting by fives. On the chalkboard, write the first sentence shown. Ask how many sets of five there are and write the second sentence. Ask if anyone knows of a shorter way to write that three sets of five are fifteen. Have a child write the third sentence shown and read it.

$$5 + 5 + 5 = 15$$

$$3 \text{ sets of five are } 15$$

$$3 \times 5 = 15$$

Repeat the procedure for other sets of five. Write the sentences and have the children read each multiplication sentence.

- Write these two sentences on the chalkboard.

$$4 \text{ sets of } 5 \text{ are } \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

Have the children use small objects and display four sets of five and count by fives to determine how many there are. Have a child complete the first sentence on the chalkboard. Ask what numbers belong in the blanks for the second sentence. Have a child complete the sentence on the chalkboard. Have the children read the completed sentence: "Four times five equals twenty."

- Write exercises similar to the following on the chalkboard or prepare a work sheet. Have the children complete the sentences.

$$3 \text{ sets of } 5 \text{ are } \underline{\quad}$$

$$8 \text{ sets of } 5 \text{ are } \underline{\quad}$$

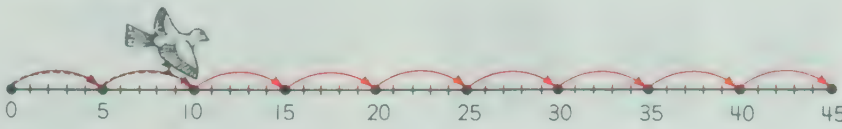
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

### Using the Page

- Discuss with the children the first exercise and then have them work independently. After they have completed the page, have children describe each illustration and read the multiplication sentence; for example, "There are three sets of five. Three times five equals fifteen."

Start at 0 and jump by fives.  
Show nine jumps.



Complete each number sentence.  
Use the number line to help.

$9 \times 5 = 45$

$3 \times 5 = 15$

$2 \times 5 = 10$

$4 \times 5 = 20$

$8 \times 5 = 40$

$1 \times 5 = 5$

$5 \times 5 = 25$

$6 \times 5 = 30$

$7 \times 5 = 35$

Complete.

1 five is 5

3 fives are 15

4 fives are 20

2 fives are 10

7 fives are 35



6 fives are 30

9 fives are 45

5 fives are 25

8 fives are 40

0 fives are 0

|   |    |   |    |    |    |    |    |    |    |    |
|---|----|---|----|----|----|----|----|----|----|----|
|  | 's | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|  | 's | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |

Multiplication facts of 5

(two hundred twenty-five) 225

## LESSON OUTCOME

Complete sentences for multiplication facts of 5, to  $9 \times 5$

### Materials

a copy of a number line marked in fives to 45 for each child, demonstration number line

### RELATED ACTIVITIES

- Have the children make a page for multiplication facts of five from  $0 \times 5$  to  $9 \times 5$  and include it in the book of facts suggested on page T284.



## LESSON ACTIVITY

### Before Using the Page

- Review sets of five. State a number of fives, for example, six sets of five. Have the children count by fives and write the corresponding multiplication sentence ( $6 \times 5 = 30$ ). Have a child write the sentence on the chalkboard and read it. Use other examples.
- Have the children rote count by fives to 50. Say that you would like to jump by fives on the number line, starting from zero. Write  $7 \times 5 = \underline{\quad}$  on the chalkboard. Ask how many jumps of five you should show on the number line for  $7 \times 5$ . Have the children count the jumps as you draw them. Ask, "What number did we reach?" Have a child complete the multiplication sentence on the chalkboard. Repeat for other examples. For  $0 \times 5$  (zero jumps of five), emphasize that no move is made from zero.
- Give each child a copy of a number line marked in fives to 45. Ask, "How many jumps of five are needed to reach 40?" Have the children use their number lines to determine the answer.

Illustrate the jumps on the demonstration number line. Write the pair of sentences (8 fives are 40 and  $8 \times 5 = 40$ ) on the chalkboard. Repeat the procedure for other pairs of sentences. Have the children help to complete the sentences on the chalkboard.

- On chart paper, prepare the following table comparing the number of flowers with the number of petals. Have the children help to complete the table. Then ask questions such as "How many petals are there for 4 flowers?" "How many flowers are there for 10 petals?"

|   |   |   |   |   |
|---|---|---|---|---|
|  | 0 | 1 | 2 | 9 |
|  | 0 | 5 |   |   |

### Using the Page

- Read the instructions with the children. Have the children show nine jumps of five on the number line. Ask what number is reached. Then let the children work independently. After they have completed the page, ask questions such as "How many quarters have the same value as 10 nickels?" "How many nickels have the same value as 6 quarters?"



## LESSON OUTCOME

Solve problems involving multiplication facts of 2, 5, and 10

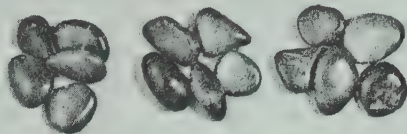
## Materials

various objects bundled in sets of two, five, and ten

## RELATED ACTIVITIES

- Have the children use copies of page T344 and color nine rows of squares to illustrate  $1 \times 2$  to  $9 \times 2$ . Ask them to alternate colors as they indicate sets of two.
- Encourage the recall of the basic multiplication facts by using oral questions. Pace these according to the ability of the children. You may wish to have the children record their answers.

Complete.



3 piles of stones

5 stones in each pile

$$\underline{3 \times 5 = 15}$$

15 stones in all

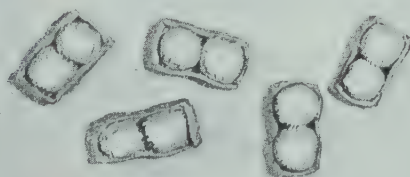


3 pairs of boots

2 boots in each pair

$$\underline{3 \times 2 = 6}$$

6 boots in all



5 pans of bread

2 loaves in each pan

$$\underline{5 \times 2 = 10}$$

10 loaves in all



4 bundles of logs

10 logs in each bundle

$$\underline{4 \times 10 = 40}$$

40 logs in all

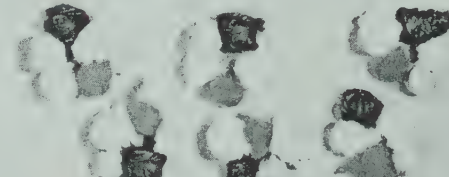


4 sets of candles

5 candles in each set

$$\underline{4 \times 5 = 20}$$

20 candles in all



6 piles of yarn

5 balls in each pile

$$\underline{6 \times 5 = 30}$$

30 balls in all

226 (two hundred twenty-six)

Solving problems involving multiplication

## LESSON ACTIVITY

## Before Using the Page

- Prepare in advance several bags or boxes of objects grouped in different ways as suggested below.
- Forty sticks bundled in fives (8 bundles)
- Thirty-five pencils grouped in fives (7 groups)
- Forty dried beans in bags by tens (4 bags)
- Seventy Unifix cubes joined in tens (7 trains)
- Sixteen erasers bound in twos with rubber bands (8 pairs)
- Eighteen blocks in bags by twos (9 bags)

Display the bag containing the sticks and say, "There are some bundles of sticks in this bag. I will tell you how many bundles there are. Try to tell me how many sticks there are." Look into the bag as though you are counting the bundles. Then say, "There are 8 bundles" as you write the words on the chalkboard. Then ask, "Can you tell how many sticks there are in the bag?" The children will likely say that they

8 bundles of sticks  
5 sticks in each bundle  
 $8 \times 5 = 40$   
40 sticks

cannot unless you tell them how many sticks there are in each bundle. Then tell them that there are five sticks in each bundle and write this under the first phrase. Repeat the problem: "Eight bundles of sticks. Five sticks in each bundle. How many sticks are there?" Have the children suggest the answer and ask them how it was obtained. If repeated addition is suggested, write the addition sentence and ask for a shorter way to show it. Then, under the second statement write the multiplication sentence and the answer to the question.

Use a similar procedure to present other problems for the children to solve, using the materials described. For each problem, write the statements on the chalkboard.

You may wish to include the extra step "7 sets of 5", since the children are familiar with forming a multiplication sentence from this step.

7 groups of pencils  
5 pencils in each group  
7 sets of 5  
 $7 \times 5 = 35$   
35 pencils

## Using the Page

- Discuss the first problem with the children and then let them work independently.

## LESSON OUTCOME

Determine numbers represented by multiplication and addition phrases, products and sums to 90

## Materials

special work sheets of problems

## RELATED ACTIVITIES

- Have the children use Unifix cubes to build "trains" to illustrate and compare the basic multiplication facts of two, five, and ten. Have them use alternating colors as shown. Through this activity, children can see that the "trains" for 5 extend farther than the "trains" for 2, and the "trains" for 10 extend farthest in the three sets.

Have the children search among the "trains" in the three sets to find those that are of the same length. (See below)

- Have the children use separate sheets of paper for each of the numbers 2, 5, and 10. Have them write one of the numerals at the top of each sheet and list the multiplication facts they have learned for that number. The children may use these sheets to help them prepare game boards for the game "Multifact" described on page T299.

Count by 2's, 5's, and 10's.

2  
4  
6  
8  
10  
12  
14  
16  
18

5 10 15 20 25 30 35 40 45 50

10 20 30 40 50 60 70 80 90 100

Complete the number puzzle.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 1 | 2 |   | B | 3 | 0 |   | C | 1 | 4 |   | D | 4 |
|   | 0 |   | E | 3 | 0 |   | F | 4 | 0 |   | G | 6 | 0 |
|   |   | H | 4 | 5 |   | I | 1 | 8 |   | J | 5 | 0 |   |
| K | 9 | 0 |   | L | 2 | 0 |   | M | 2 | 5 |   | N | 1 |
|   | 0 |   | U | 1 | 0 |   | P | 7 | 0 |   | U | 1 | 6 |
|   |   | R | 4 | 5 |   | S | 2 | 0 |   | T | 2 | 5 |   |
| U | 1 | 0 |   | V | 2 | 5 |   | W | 8 | 0 |   | X | 8 |

Multiplication practice facts of 2, 5, and 10

(two hundred twenty-seven) 227

## LESSON ACTIVITY

### Before Using the Page

• A work sheet of problems similar to the following may be used at this time to reinforce the relationship between multiplication and repeated addition.

How many pods? \_\_\_\_\_  
 How many peas in each pod? \_\_\_\_\_  
 How many peas in all? \_\_\_\_\_



How many bowls? \_\_\_\_\_  
 How many fish in each bowl? \_\_\_\_\_  
 How many fish in all? \_\_\_\_\_



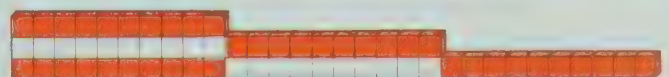
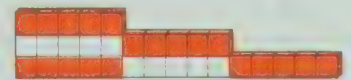
How many "trains"? \_\_\_\_\_  
 How many cubes in each "train"? \_\_\_\_\_  
 How many cubes in all? \_\_\_\_\_



### Using the Page

• Discuss with the children how they are to complete the sequences for twos, fives, and tens.

For the cross-number puzzle, review the procedure of finding the number represented by each phrase and writing the answer in the squares according to the letters given. Review the meanings of the words "across" and "down". Tell the children that they may consider the numbers in any order, but they should ring the letter in the column after each number is shown in the squares.





## OBJECTIVE

Add and subtract two-digit numbers, no regrouping, sums and minuends to 99

## Materials

a copy of the number chart on page T333 for each child

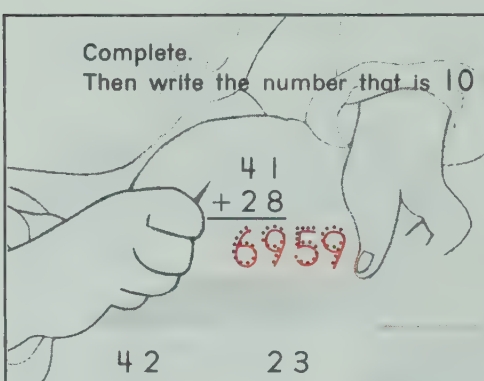
## RELATED ACTIVITIES

- Have the children complete work sheets similar to the following.

| +  | 10 |
|----|----|
| 14 |    |
| 36 |    |
| 45 |    |
| 72 |    |
| 27 |    |
| 81 |    |
| 53 |    |

| -  | 10 |
|----|----|
| 99 |    |
| 26 |    |
| 42 |    |
| 31 |    |
| 87 |    |
| 76 |    |
| 55 |    |

Complete.  
Then write the number that is 10 less.



41  
+ 28  
69 59

42 + 16 = 58 48  
23 + 34 = 57 47  
75 + 21 = 96 86  
84 - 32 = 52 42  
87 - 45 = 42 32  
10 + 46 = 56 46  
35 + 20 = 55 45  
66 - 34 = 32 22  
25 - 3 = 22 12  
75 - 21 = 54 44  
64 + 35 = 99 89  
37 + 51 = 88 78  
98 - 21 = 76 67  
76 - 10 = 66 56  
51 + 47 = 98 88  
42 + 47 = 89 79  
64 + 23 = 87 77  
79 - 48 = 31 21  
39 - 26 = 13 3  
35 + 12 = 47 37  
12 + 62 = 74 64  
84 - 20 = 64 54  
99 - 53 = 46 36

228 (two hundred twenty-eight) Addition and subtraction practice, sums and minuends to 99

## LESSON ACTIVITY

### Before Using the Page

- Spend a few minutes reviewing basic addition and subtraction facts having sums and minuends to 9. You may present these orally and have the children write the answers. You may prefer to use work sheets having the number of facts that the children can complete in one or two minutes.
- Write an addition exercise for two-digit numbers (no regrouping) on the chalkboard. Review the procedure required to find the sum. Repeat for several other addition exercises.
- Write a subtraction exercise for two-digit numbers on the chalkboard. Review the procedure required to find the difference. Repeat for several other subtraction exercises.
- Write several addition and subtraction exercises for two-digit numbers (no regrouping) on the chalkboard. Have the children copy and complete them. Have children write answers on the chalkboard and explain the procedure used.
- Give each child a copy of the number chart on page T333. Have them color the squares as you give the following direc-

tions. When the children have finished, the colored squares will form the letter E.

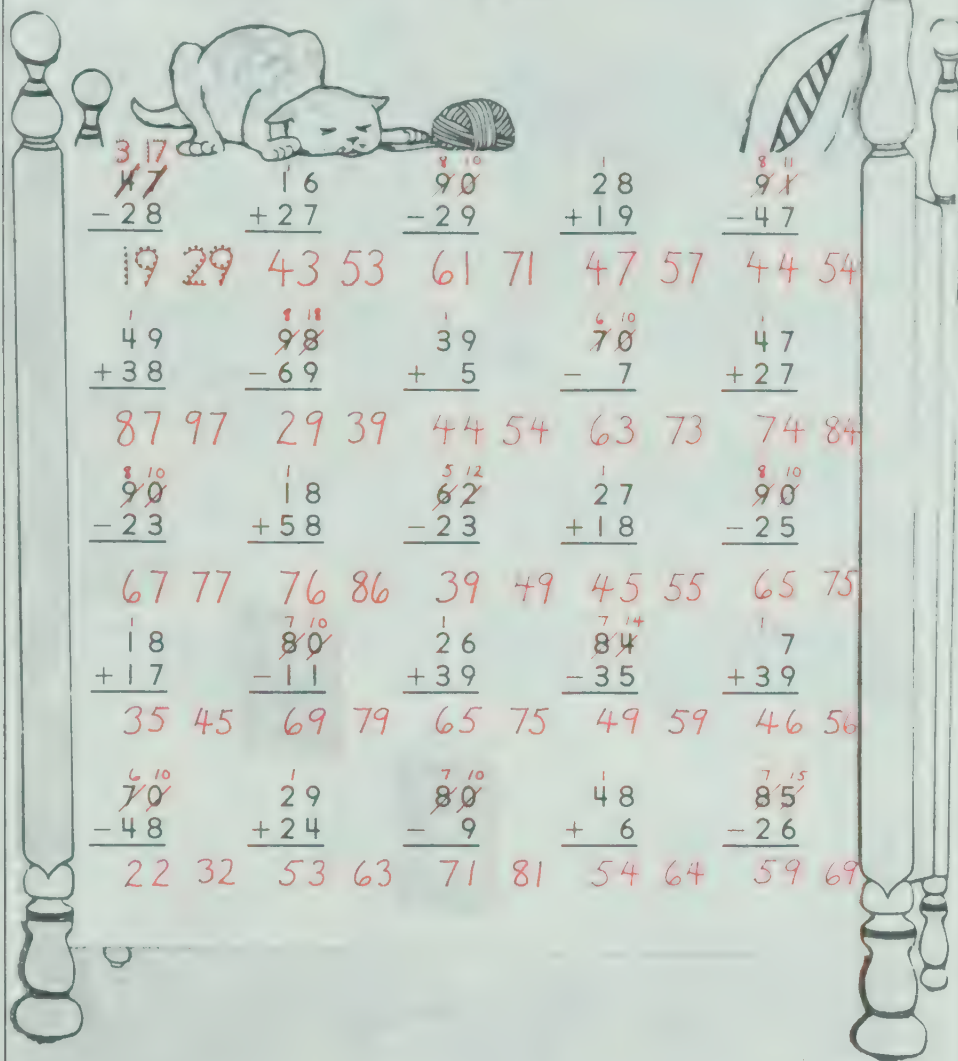
- Color inside the squares for the number that is 10 greater than each of these numbers.  
78 2 8 22 42 72 76 36 4 32 5 34 73
- Color inside the squares for the number that is 10 less than each of these numbers.  
23 32 53 82 94 72 26 55 27 95 97

### Using the Page

- Read the instructions to the children. Discuss the completed exercise and ask why the dotted 59 is shown beside the dotted 69. You may wish to have the children write all the answers before they write any of the numbers that are 10 less than the sums or the differences.

Complete.

Then write the number that is 10 greater.



317  
~~47~~  
-28  
19 29 43 53 61 71 47 57 44 54

16  
+27  
29 39 44 54 63 73 74 84

90  
~~90~~  
-29  
28  
+19  
47  
-47

49  
+38  
87 97 29 39 44 54 63 73 74 84

98  
~~98~~  
-69  
39  
+5  
70  
-7  
47  
+27

87 97 29 39 44 54 63 73 74 84

90  
~~90~~  
-23  
18  
+58  
27  
+18  
90  
-25

67 77 76 86 39 49 45 55 65 75

18  
+17  
35 45 69 79 65 75 49 59 46 56

80  
~~80~~  
-11  
26  
+39  
84  
-35  
7  
+39

610  
~~610~~  
-48  
29  
+24  
80  
~~80~~  
-9  
48  
+6  
85  
-26

22 32 53 63 71 81 54 64 59 69

Addition and subtraction practice sums and minuends to 99

(two hundred twenty-nine) 229

## Page 229

### OBJECTIVE

Add and subtract two-digit numbers, regrouping, sums and minuends to 99

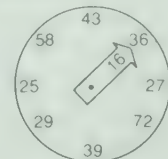
### RELATED ACTIVITIES

- Prepare a game board as shown and fasten it to the floor. Have a child stand about two metres away from the board and toss a bean bag onto the board. State a number and have all the children record it and add to it the number indicated by the toss of the bean bag.



After the children have completed the exercise, state the answer for them to check their work. Have another child toss the bean bag and continue the procedure. At the end of a given time, collect the work sheets for diagnosing the errors.

- You may wish to adapt the previous activity by having the children use a spinner as shown. Because the number on the spinner is less than each number around the edge of the disk, it can be added to or subtracted from each of the other numbers.



## LESSON ACTIVITY

### Before Using the Page

- Spend a few minutes reviewing the basic addition and subtraction facts, emphasizing those that have sums and minuends of 10 to 18. You may present these orally and have the children write the answers. You may prefer to use work sheets having the number of facts that the children can complete in one or two minutes.
- Write an addition exercise for two-digit numbers requiring regrouping on the chalkboard. Review the procedure required for regrouping ten ones as one ten.
- Write a subtraction exercise for two-digit numbers requiring regrouping on the chalkboard. Review the procedure required for regrouping one ten as ten ones.
- Write several addition and subtraction exercises for two-digit numbers requiring regrouping on the chalkboard. Have the children copy and complete them. Have children write the answers on the chalkboard and explain the procedure used. The children who need to should show the regrouping required for

each exercise. Some children may also need to draw a line to separate the tens and the ones.

- Have the children start at 10 and count by tens to 100. Have them start at other numbers, for example, 4, and count by tens. State a number and have children state the number that is 10 greater than the given number.

### Using the Page

- Read the instructions to the children. Discuss the completed exercise and ask why the dotted 29 is shown beside the dotted 19. You may wish to have the children write all the answers before they write any of the numbers that are 10 greater than the sums or the differences.



## LESSON OUTCOME

Determine two amounts of money equivalent to one dollar

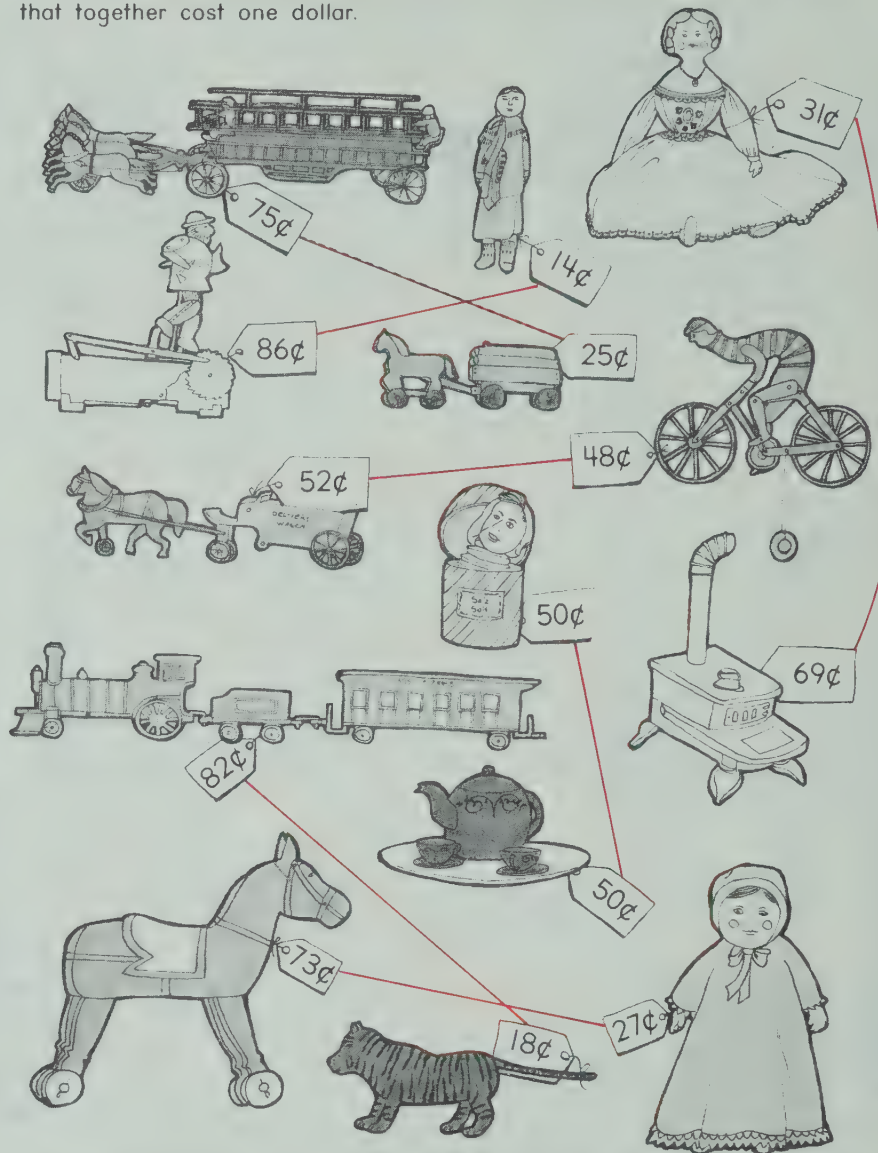
### Materials

real money, play money, or coin cutouts from copies of page T327, envelopes, play store with pairs of items that together cost one dollar

## RELATED ACTIVITIES

- You may wish to have the children play the game "Collection" as described on page T299.

Match the price tags of the two items that together cost one dollar.



Use coins for counting on to one dollar

230 (two hundred thirty)

Adding with money, two amounts equivalent to one dollar

## LESSON ACTIVITY

### Before Using the Page

- Display sets of coins having values up to one dollar and have children determine the values. Then state amounts of money up to one dollar and have children use real money or coin cutouts to display sets of coins for the given amounts.
- Give each child an envelope containing 3 quarters, 1 dime, 2 nickels, and 5 pennies. Have them determine the value of the set of coins. Lead them to suggest the value "one dollar".

Mark objects in the play store so that there are pairs that together cost one dollar; for example, 67¢ and 33¢, 25¢ and 75¢, 20¢ and 80¢. Have one child select an object, say the one for 80¢. Ask the other children to remove coins from the envelopes for that value. Ask how much money they have left (20¢). Then ask if they see an object with a price of 20¢. Ask how much money they would spend for the two objects.

Have another child select an object for repeating the procedure. Then have children decide for themselves what pairs of objects they can buy for one dollar.

- Record the following chart on the chalkboard.

| How much more will make one dollar? |     |     |     |     |     |
|-------------------------------------|-----|-----|-----|-----|-----|
| 35¢                                 | 16¢ | 28¢ | 69¢ | 84¢ | 50¢ |
|                                     |     |     |     |     |     |

Say that you would like to know how much money is needed with 35¢ to have one dollar. Use coins to count on from 35¢. Have the children count on with you (35 cents–40, 50, 75, 100). Then have a child determine the value of the set of coins and record it in the chart. Have the children use their coins as they help to complete the chart.

### Using the Page

- Read the instruction with the children. Ask a child to explain the significance of the broken line joining the two toys marked with prices of 75¢ and 25¢. Ask the children to find the toy with the price 86¢. Have them use their coins to count on: 87, 88, 89, 90, 100. Ask them to determine the value of the coins and find the tag for that amount. Then let the children work independently.

## LESSON OUTCOME

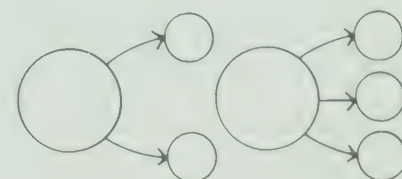
Share to show equal parts of a set

## Materials

objects for sharing, set holders

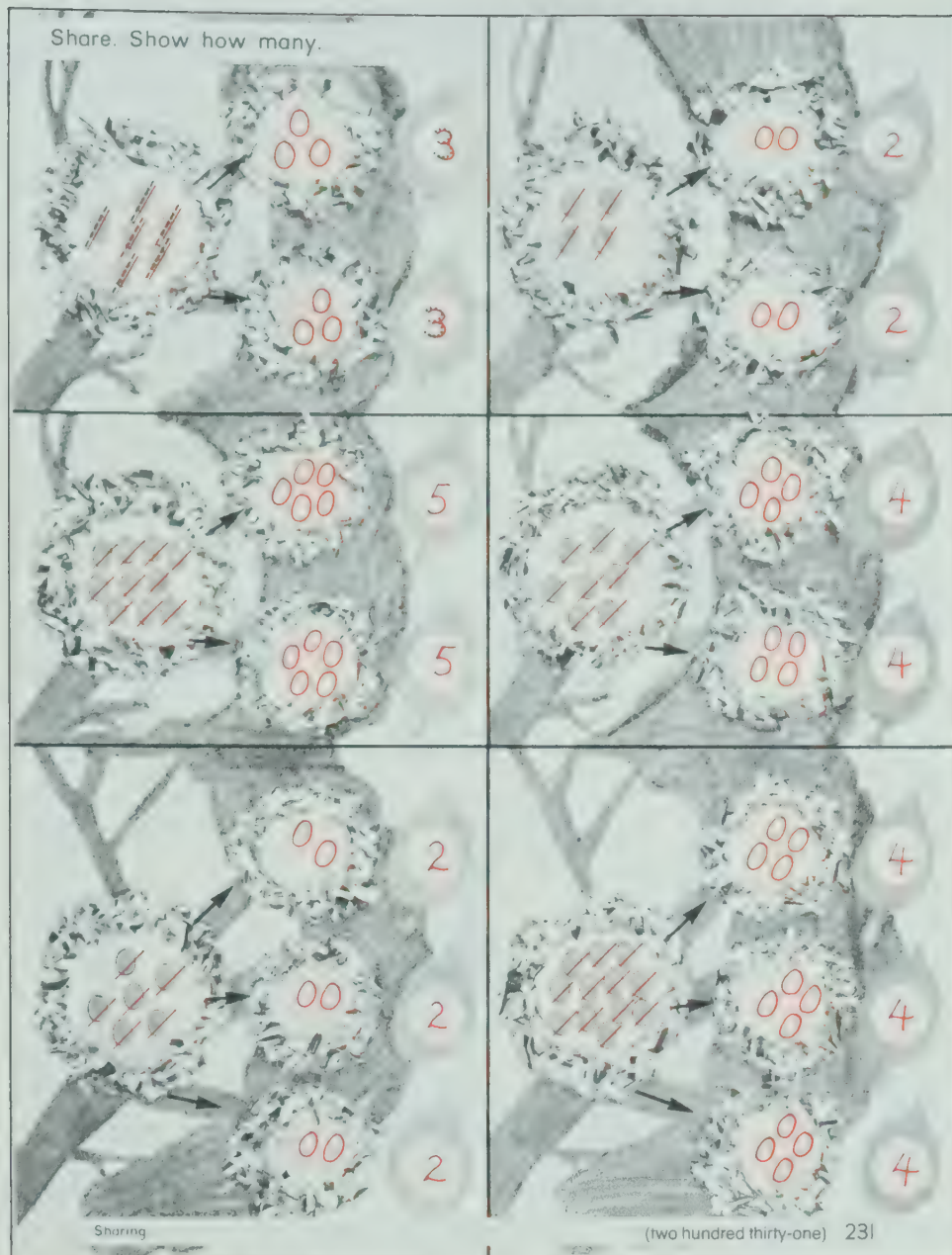
## RELATED ACTIVITIES

- After the children have completed the exercises, have them number the exercises on the page from 1 to 6. Refer to an exercise and ask questions about how many eggs are being shared, how many nests are sharing, and how many eggs there are for each nest.
- Mark pieces of Bristol board with diagrams as shown below. Prepare a work sheet to accompany each diagram. Have the children use counters such as bingo chips or beans on the appropriate diagram to find the result of sharing a number of objects between two or three groups. Then have the children write their results on the corresponding work sheet.



|    | 人 | 人 |
|----|---|---|
| 2  | 1 | 1 |
| 4  |   |   |
| 6  |   |   |
| 8  |   |   |
| 10 |   |   |

|    | 人 | 人 | 人 |
|----|---|---|---|
| 3  | 1 |   |   |
| 6  |   |   |   |
| 9  | 3 | 3 | 3 |
| 12 |   |   |   |
| 15 |   |   |   |

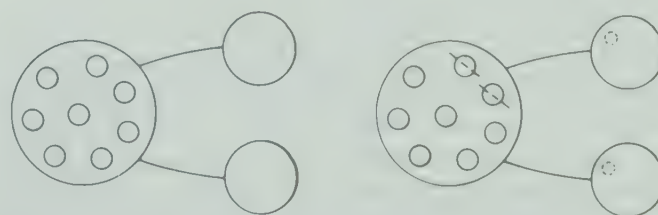


## LESSON ACTIVITY

### Before Using the Page

- Have the children work in pairs using 18 objects. Have the children take 12 objects and share them. Each child in turn takes one object until both have the same number of objects. Ask how many objects each child has. Have the children make statements about what they did; for example, "We had 12 cards. The two of us shared them equally. We each got 6 cards." Repeat the procedure for other even numbers to 18.
- Have the children work in groups of three for sharing 3, 6, 9, 12, or 18 objects equally. If you prefer to have the children work alone, give each child three set holders and 18 objects. Have the children share the indicated number of objects among the three set holders and count the objects in each set holder.
- Draw a diagram similar to the following on the chalkboard. Ask how many "buttons" there are in the large set holder. Choose one child to share the "buttons" with you in the following way. As you say, "One button for me", cross out one "button" and draw a "button" in one of the smaller set holders.

Have the child use a similar procedure for the other small set holder. Continue the procedure until all the "buttons" have been shared. Ask how many "buttons" there are for each of you. Use other similar examples. Then extend the activity to sharing a suitable number of "buttons" among three.



### Using the Page

- Read the instructions at the top of the page. For the first exercise, ask how many eggs are being shared and how many are sharing. Have the children complete the first exercise under your guidance, tracing over the marks and the numerals. Then let the children work independently.



## LESSON OUTCOME

Identify slides, turns, and flips

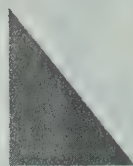
### Materials

pins, cutouts of shapes, cutouts of shapes from copies of page T346 for each child

## RELATED ACTIVITIES

- Have the children make patterns by tracing around the cutouts of the shapes for page 232. Some other patterns are shown on page T299 for the children to describe.

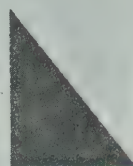
How can you make the red shape fit the blue shape?



Slide

Turn

Flip



Slide

Turn

Flip



Slide

Turn

Flip



Slide

Turn

Flip



Slide

Turn

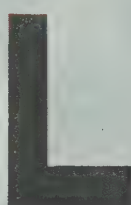
Flip



Slide

Turn

Flip



Slide

Turn

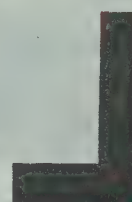
Flip



Slide

Turn

Flip



Slide

Turn

Flip

232 (two hundred thirty-two)

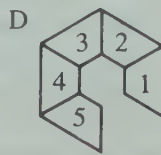
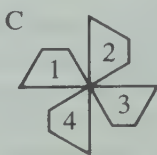
Identifying slides, turns, and flips

## LESSON ACTIVITY

### Before Using the Page

- Review the concepts of slide, turn, and flip using suggestions from pages T240, T241, and T270.
- Use stiff cardboard to make cutouts of simple shapes. Have children trace around the shape of their own choosing to make three patterns, one by sliding the shape, one by flipping the shape, and one by turning the shape about one vertex (with the help of a pin). Children may describe to other children how their own patterns were made, illustrating with the cutout, if necessary, where describing the process is difficult.

You may also show patterns to the children and have them describe or illustrate the procedure used to form the pattern. Some examples are given below.



If the children number the shapes in the order in which they were drawn, it will be easier to explain the process used or to have other children determine the process used. For some shapes and some patterns, more than one motion can be used to describe the process. For example, for pattern B above, the cutout may have started at position 1 and been turned about the midpoint of one side to obtain each successive position. Or, the cutout may have started at position 1 and been flipped about one side to obtain each successive position. The children should be led to discover that there is often more than one description for a pattern. They should test their conjectures using the cutout.

### Using the Page

- Read the question to the children. Discuss the first exercise. Ask children whether the red shape can be made to fit the blue shape in more than one way. Provide cutouts from copies of page T346 of the three different shapes shown on this page. Encourage the children to test each motion to see whether it can be obtained in more than one way, for example, the second and third exercises in the second row.

## LESSON OUTCOME

Estimate an interval of one minute

### Materials

string and a metal washer or nut to make a simple pendulum, a clock with a second hand

### Vocabulary

second hand

## RELATED ACTIVITIES

- Time the children to carry out certain actions in the gym, for example, run for one minute, walk for one minute, hop for one minute, skip for one minute, stand on one foot for one minute.

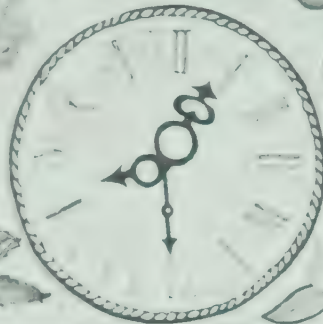
Answers will vary.

How many times in one minute can you

skip with a rope? \_\_\_\_\_ bounce a ball? \_\_\_\_\_

bend to touch your toes? \_\_\_\_\_  
count to 100 by tens? \_\_\_\_\_

print your name? \_\_\_\_\_



How many times in one minute can you

Estimate Measurement

walk across the classroom? \_\_\_\_\_

clap your hands? \_\_\_\_\_

wink with your right eye? \_\_\_\_\_

count to 50 by fives? \_\_\_\_\_

say "Four fat flatfish"? \_\_\_\_\_

Estimating an interval of one minute

(two hundred thirty-three) 233

## LESSON ACTIVITY

### Before Using the Page

- Measure intervals of time using hand claps as non-standard units. Have the children follow your rate of clapping. Pose the following problems: "How many hand claps would it take for Michael to walk to the chalkboard and back?" "How many hand claps would it take for Susan to walk around the classroom?" After several actions have been timed, encourage the children to record an estimate before the next action is timed.
- Attach a washer (nut, bolt) to a string 30 cm long and suspend it from a convenient place. Hold the washer to one side with the string taut. Have the children practise counting the swings of this simple pendulum (one swing is complete when the washer returns to its starting position). Use the pendulum to measure the intervals of time for actions as in the first activity and for group activities such as lining up to go for recess. Then choose an interval of time and have the children see how many times they can perform an action in that interval.
- Say that we don't usually count pendulum swings or hand claps to tell how long it takes to do something. Lead the children

to suggest that for short activities, we count the minutes. Ask how many minutes there are in one hour. Discuss how they can tell from a clock when one minute has passed.

Have the children observe a clock with a *second hand*. Tell them that this hand takes one minute to move all the way round the clock face. Have the children watch in silence as the hand moves through a one-minute interval, and then ask them if this seems like a short time or a long time. See how many times children can perform an activity during a one-minute interval; for example, print the numerals 0 to 9, join Unifix cubes to form "trains" of ten, take heel-to-toe steps.

### Using the Page

- For the first part of the page, children may work in pairs in the classroom or the gym, timing each other with a clock or a watch having a second hand. For the second part of the page, ask the children to record an estimate first. You may prefer to time the children as they perform each activity.



**OBJECTIVE**

Demonstrate an understanding of concepts presented in this unit

**Materials**

Bristol board, cubes, special activity card, cards for multiplication facts, special work sheet (optional)

**RELATED ACTIVITIES**

• Children may help to prepare a long string of "elevator beads" as described on page xxxi. Suspend the string from a hook. Have the children separate the beads to show sets of 2, 5, or 10. Tags showing multiplication facts may be clipped at various points along the string as shown on page T299.

How many cubes in each?



6



10



8

Complete.

$4 \times 2 = \underline{8}$

$6 \times 2 = \underline{12}$

$5 \times 2 = \underline{10}$

$7 \times 2 = \underline{14}$

$3 \times 2 = \underline{6}$

$8 \times 2 = \underline{16}$

$4 \times 10 = \underline{40}$

$9 \times 10 = \underline{90}$

$6 \times 10 = \underline{60}$

$3 \times 10 = \underline{30}$

$8 \times 10 = \underline{80}$

$5 \times 10 = \underline{50}$

$3 \times 5 = \underline{15}$

$5 \times 5 = \underline{25}$


$0 \times 5 = \underline{5}$


$6 \times 5 = \underline{30}$

$9 \times 5 = \underline{45}$

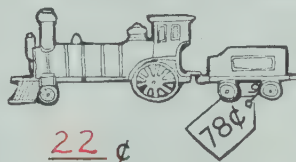
$8 \times 5 = \underline{40}$

Complete the tables.

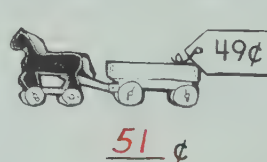
|  |          |          |           |           |
|--|----------|----------|-----------|-----------|
|  's | 1        | 2        | 5         | 8         |
| o 's   | <u>2</u> | <u>4</u> | <u>10</u> | <u>16</u> |

|  |          |           |           |           |
|--|----------|-----------|-----------|-----------|
|  's | 1        | 2         | 4         | 8         |
| • 's   | <u>5</u> | <u>10</u> | <u>20</u> | <u>40</u> |

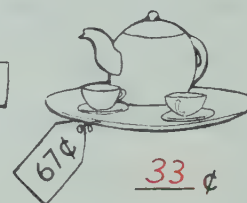
How much more is needed to make one dollar?



22 ¢

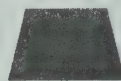


51 ¢



33 ¢

How can you make the red shape fit the blue shape?



Slide Turn Flip

Slide Turn Flip

Slide Turn Flip

234 (two hundred thirty-four)

CHECKUP

**LESSON ACTIVITY****Before Using the Page**

• Review some of the concepts presented in this unit by selecting from the following activities.

- Using Bristol board, make three boxes (no lids) having the same volume but different dimensions. Choose the unit length according to the dimensions of the cubes available in the classroom. For example, three boxes measuring 9 by 4 by 1, 12 by 3 by 1, and 3 by 3 by 4 units would each hold 36 unit cubes. Prepare the following activity card to accompany the three boxes and a set of cubes for filling the boxes.

Which box is the largest?    A    B    C  
Check by filling each box with cubes.  
Tell what you discovered.

- Have the children use 24 cubes to build the shape of a box (rectangular prism). Have them repeat the activity to see how many different boxes they can form. A plan of each box shown on squared paper will help to avoid repetition of shapes. Six of the possible ways are shown.

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 |

|   |   |   |   |
|---|---|---|---|
| 3 | 3 | 3 | 3 |
| 3 | 3 | 3 | 3 |

|   |   |   |
|---|---|---|
| 4 | 4 | 4 |
| 4 | 4 | 4 |

|   |   |   |   |
|---|---|---|---|
| 6 | 6 | 6 | 6 |
|---|---|---|---|

|   |   |   |
|---|---|---|
| 8 | 8 | 8 |
|---|---|---|

|    |    |
|----|----|
| 12 | 12 |
|----|----|

- Prepare a set of cards that show a multiplication phrase on one side and the corresponding repeated addition phrase on the other side. Children may work in small groups with a leader who shows one side of each card and determines whether the response given is correct.
- Present multiplication facts orally to the children. Have the children write their answers on paper.
- Draw sets of coins on the chalkboard. Have the children determine the value of each set and then draw extra coins so that each set will have a value of one dollar.

**Using the Page**

• Discuss what the children are to do for the different kinds of exercises on the page. Then let them work independently.

## Games and Activities

### Cross-number Puzzle for page 220



#### Across

- A  $7 \times 2$   
 B  $2 + 2 + 2 + 2 + 2$   
 D  $4 \times 2$   
 E  $2 + 2 + 2$   
 F 0 sets of 2  
 G  $5 \times 2$   
 H 9 sets of 2
- I 7 sets of 2  
 J  $3 \times 2$   
 K  $2 + 2$   
 L 1 set of 2  
 M  $2 + 2 + 2 + 2$   
 N 4 sets of 2  
 O 3 sets of 2

#### Down

- A  $9 \times 2$   
 B  $8 \times 2$   
 C 5 sets of 2
- G  $7 \times 2$   
 I 6 sets of 2  
 O  $2 + 2 + 2$

### Multifact (Game for page 227)

#### Materials

one set of 30 small cards showing the multiplication phrases from  $0 \times 2$  to  $9 \times 2$ ,  $0 \times 5$  to  $9 \times 5$ , and  $0 \times 10$  to  $9 \times 10$  for each player

nine markers for each player

a game board marked into nine sections for each player

|    |    |    |
|----|----|----|
| 10 | 18 | 40 |
| 6  | 25 | 0  |
| 90 | 35 | 14 |

#### Rules

- Have the children choose nine numbers at random from the answers on the sheets prepared according to the second activity in *Related Activities* on page T291. Have the children write the nine numbers at random on their game boards.
- Children play in pairs. Each child uses her/his own game board and the 30 small cards.
- Each player places her/his cards in a bag and draws a card from the bag.
- If the answer to the fact drawn is on the game board, the player places a marker over the numeral on the game board.
- If the answer to the fact drawn is not on the game board, the card is placed in a discard pile.
- The player who first covers all the numerals on her/his game board is the winner.

### Collection (Game for page 230)

#### Materials

a game board as shown below prepared from copies of pages T327 and T328

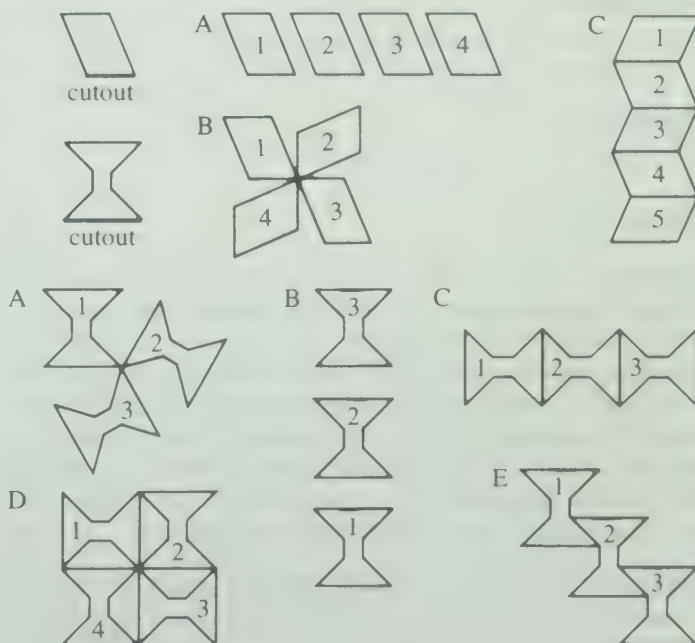
20 blue markers, 20 red markers, and a regular die



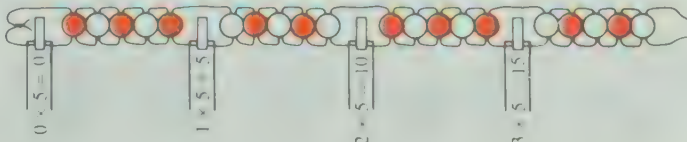
#### Rules

- Children play in pairs taking turns rolling the die.
- For the number shown on the die, a player may claim that number of identical coins. For example, if the die shows 5, the player may place her/his markers on 5 dimes, or 5 nickels, or 5 pennies (not on quarters because there are only four of them).
- The first player to obtain 1 on the die may claim the one-dollar bill.
- When the game board has been covered with markers, each player finds the total value of her/his coins covered. The player who has the greatest amount of money is the winner.

### Patterns for page 232



### Activity for page 234





## Unit 12 Overview

The last unit of *Starting Points in Mathematics 2* introduces only three new topics: addition and subtraction of three-digit numbers, first without regrouping and then with regrouping between tens and ones, and the comparison of areas of geometric shapes using tangram pieces. Since the work in addition and subtraction is merely an extension of earlier skills, the exercises provide valuable review and practice of the basic facts and processes in these two operations. Further work in making change to 50 cents and in selecting coins for amounts to \$1.99 is included. The activities using tangram pieces provide interesting insights into relationships among the various pieces. They also invite children to be creative in the realm of geometry. The unit concludes with a *Checkup* of the skills involved in adding, subtracting, and making change. This is followed by a comprehensive *Year-End Checkup* that provides an evaluation of most of the topics in the book, especially number concepts and skills, linear measurement, temperature, time, fractions, motion geometry, and solving word problems.

### Unit Outcomes

#### Number

- add three-digit numbers, no regrouping, sums to 999
- subtract three-digit numbers, no regrouping, minuends to 999
- add three-digit numbers, regrouping of ones as tens, sums to 999
- subtract three-digit numbers, regrouping of tens as ones, minuends to 999

#### Measurement

- choose the coins needed for a given amount
- make change for amounts to 50 cents

#### Geometry

- compare areas of geometric shapes

#### Background

**Number:** Addition and subtraction with three-digit numbers involves only an extension of the same principles that were used with two-digit numbers. Each place value is treated in turn, beginning from the ones on the right to the tens and then to the hundreds. A review of the base-ten numeration system should include the concepts that ten tens are equal to one hundred and that ten ones are equal to one ten, so that children can carry out with greater understanding any regrouping that may become necessary in their work with addition and subtraction.

**Measurement:** This unit directs further attention to counting money and making change. To determine the value of a set of coins the addition and counting on proceed from coins of greatest value to those of least value. For example, for the set of coins shown, the cumulative values would be 25¢, 35¢, 40¢, 41¢, 42¢, 43¢.



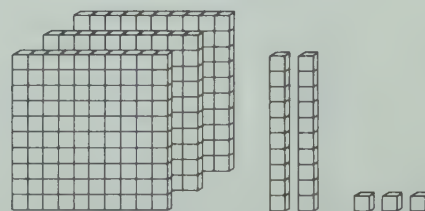
In making change, however, the procedure starts with the amount of the sale and change is added to this amount, beginning with the coins of least value. As strategic sums are reached, primarily multiples of five or ten, coins of greater value are used. For example, when 50¢ is used to pay for a purchase having a price of 28¢, two pennies are used to count on to 30¢, then two dimes are used to reach 50¢. The cumulative amounts stated in doing so would be 28¢, 29¢, 30¢, 40¢, 50¢. Counting by ones, fives, and tens is needed in both of these activities with money.

**Geometry:** The fascinating puzzle called the *tangram* is used in this unit for children to compare the areas of geometric shapes. The ancient Chinese developed the tangram puzzle which, according to legend, originated accidentally when a square piece of tile fell and broke into seven geometric pieces. Many different geometric and pictorial arrangements can be made with the pieces, and whole volumes have been published in China of tangram patterns that people have made and solved. Adults as well as children enjoy the challenge of duplicating patterns and creating new arrangements. A variety of shapes can be made merely by rearranging pieces, and by this means their areas can be determined to be equal. Two shapes that are formed by using different combinations of tangram pieces are also easily compared to determine which is larger or smaller.

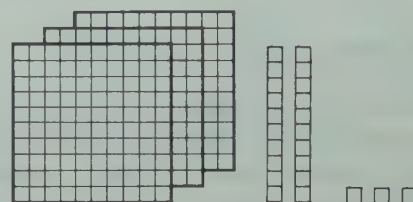
#### Teaching Strategies

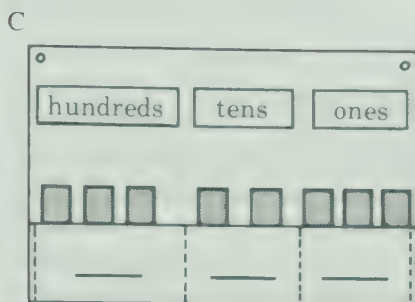
A variety of teaching aids is useful for addition and subtraction with three-digit numbers, particularly when regrouping is involved. Base Ten Blocks (A) or sheets of paper showing 100 squares, strips of 10 squares, and single squares (B) are quite effective and can be related easily to representative materials in place-value pocket charts (C), to numerals written on abacus charts (D), and to the standard numerals (E). It is desirable that children manipulate the materials as they perform the regrouping before they attempt to operate only at the abstract level. At this stage the children should discontinue the use of concrete materials to indicate regrouping only when the procedures are clearly understood.

A



B





D

| h | t | o |
|---|---|---|
| 3 | 2 | 3 |

E  
323

Envelopes containing different sets of coins can provide valuable experience in counting money, but check occasionally to determine whether the children consider the coins in the proper order. Otherwise, children may develop inefficient techniques. Similarly, in making change, the children can work together in a play store and take turns at being the storekeeper, but also check from time to time to ensure they use the correct procedure.

Tangrams allow children to have fun solving puzzles that are frequently open-ended; that is, puzzles for which there is more than one solution. For this reason, the experiences with tangrams need not be restricted to those suggested for page 235. Tangram pieces should be available for several weeks so that children may use them in their spare time.

When introducing tangrams allow children time to explore and experiment with the pieces. Sets made of different colors can be combined to provide many more pieces of the same shapes, and simple patterns and borders can be made from these. Easy challenges can be offered by limiting the children to certain shapes, such as making a design using only the largest triangles and the smallest triangles, or using the small square and the smallest triangles.

Tangram pattern cards showing full-scale shapes and designs can be made and placed with the sets of pieces for the children to use. The cards can be numbered from the easier puzzles to the more difficult so that appropriate cards can be presented to children of different abilities. In this way children may progress from the simpler tasks to the more difficult ones. However, some children who are quite competent in using numbers and operations are often surpassed in the use of tangrams by children who have difficulty with numbers and operations. Skills used with tangrams are of a different kind. This is one reason why tangrams fascinate—and frustrate—so many people.

The *Checkup* at the end of this unit tests the skills and concepts of the unit with one exception. Perceptual skills involved in the use of tangrams must be tested by working with children in small groups, so that their responses can be observed as they manipulate the pieces.

The *Year-End Checkup* on pages 247 to 250 concentrates on the major number concepts and on operations that are developed in Book 2. Besides the paper-and-pencil-response technique to which the book is limited, other methods of testing will be required. For some topics, oral instructions or questions may be given; and the children may respond either orally or in writing, or in actual performance to indicate their understanding and skill. These topics include ordinal number concepts, place values in two-digit and three-digit numbers, concepts related to time, capacity, mass, and volume, the commutative and associative properties of addition, the inverse relationship between addition and subtraction, the skills involved in counting money and making change, and three kinds of transformations (slide, turn, flip).

It is recommended that the achievement level of each child be determined before the end of the school term and, for this purpose, a checklist of the major concepts and skills is given on pages T349 and T350. Any weaknesses that become apparent can be diagnosed; and, if time permits, appropriate reteaching and practice should be carried out.

### Materials

- plastic or cardboard tangram pieces for each child
- a copy of page T348 for each child
- odometer device as described on page T275
- a flip chart for each child
- models for hundreds, tens, and ones
- a sheet of paper marked to show columns for hundreds, tens, and ones for children who need help
- place-value pocket chart for representing three-digit numbers
- three-place abacus
- real money, play money, or coin cutouts from copies of page T327
- a copy of the special chart described on page T310 for each child
- pictures of sets of coins (optional)
- objects marked with prices of 2¢, 5¢, 9¢, 10¢, 13¢, 23¢, 34¢
- work sheets for addition and subtraction exercises
- materials to prepare the game "Parking Lot" described on page T316
- cards showing sets of coins having values to 99 cents

### Vocabulary

|         |                          |
|---------|--------------------------|
| tangram | parallelogram (optional) |
|---------|--------------------------|



## Unit 12 Theme – Across Canada

The purpose of this theme is to acquaint the children with the features that make Canada unique as a nation and make them aware of the geography of Canada and her natural resources. It is hoped that the activities will help to develop pride in our heritage and an understanding of what to be Canadian means.

### LANGUAGE ACTIVITIES

#### 1. Discussing Canada

Display a large map of Canada. Discuss with the children how the shape of the country suggests a rectangle. Point out that the map of Canada is divided into twelve parts. Have the children count as you point to each province or territory. Explain that ten of these regions are called *provinces*. Locate the province in which you live and its name on the map. Now, find your city, town, or nearest populated area on the map. Discuss which province is to the east, which province is to the west, and which province is farthest from your province. In the north are two regions called *territories*. Locate the Yukon Territory and the Northwest Territories.

Tell the children that the motto for Canada is *A mari usque ad mare*, which means “From sea to sea”. Discuss why this is a good description of Canada. Have the children locate the oceans on both the east and the west coasts of Canada and state their names. Have the children locate the large bay outlining northern Ontario and northern Quebec. Discuss its name and mention that it is the largest bay in the world. Have the children locate the five Great Lakes and state their names. Mention that the largest one, Lake Superior, is the largest fresh-water lake in the world.

Provide each child with an outline map of Canada. Have the children color the province in which they live and print its name. Have them locate the capital of Canada and print its name.

#### 2. The Canadian Flag

Until February 15, 1965, Canada did not have a flag of her own. We used the flag of the United Kingdom, the Royal Union Flag, generally known as the Union Jack; we also used a naval flag called the Canadian Ensign. Show pictures of these two flags. Because it was decided that Canada should have a flag that would have special meaning for the people of Canada, many ideas were collected. Since maple trees grow all across Canada, the maple leaf was chosen as a symbol of Canada. Display a Canadian flag so that the children may appreciate the simplicity of the design of the flag.

Have the children suggest places where they have seen the Canadian flag flown or displayed. While it is flown on most federal government buildings, airports, and military bases, it is also used to represent Canada in other countries. The children may have seen the flag on televised sports events. Tell the children that it is customary to raise the flag each day at sunrise and to lower it at sunset. The flag may be flown at night on special occasions, when it should be well illuminated. The flag is left flying all night only at sea. The flag should never be allowed to touch the ground when it is being raised or lowered. When a flag becomes torn or faded, it should be burned. It is not considered disrespectful to burn a damaged flag.

Provide paper and crayons and encourage each child to draw a picture of the flag, using the real flag as a model.

The children may be interested to know that Canada has a large flag that is flown only on special occasions. This flag measures about 7.5 m by 15 m and is flown from the flagpole near the bandshell at the Canadian National Exhibition grounds in Toronto. Have the children mark off part of the playground to show how large this special flag is.

#### 3. The National Anthem

Display the words of the national anthem, “O Canada!”, on a chart. Explain to the children the significance of a national anthem. Read the words of each stanza. Discuss words with which the children may be unfamiliar, such as *native*, *patriot*, *glorious*, *domain*, and *stalwart*. Have the children read the words together until all the words are pronounced clearly and correctly. Display the chart so that the children can refer to the words.

#### 4. Symbols of Canada

Explain to the children that symbols are things that represent or make you think of a particular thing or idea. The flag and the national anthem are Canadian symbols because they make us think of Canada.

Display a picture of the symbol of sovereignty, The Arms of Canada. Explain to the children what it represents. Display the coat of arms of each of the ten provinces and two territories. Discuss how each coat of arms depicts a feature of the particular province or territory. Obtain a picture of the flag of each province or territory. Discuss the design of each flag and how parts of the coat of arms are often part of the design.

Each province or territory also has adopted a floral emblem. The children may be interested in discovering the floral emblem for their province.

Display a set of Canadian coins—a penny, a nickel, a dime, a quarter, a fifty-cent piece, and a silver dollar. Have the children identify the symbols that are used on the coins. Explain why the Queen, a maple twig, the beaver, the *Bluenose*, the caribou, the coat of arms, and the voyageur are represented on the coins. Then examine some Canadian stamps. Discuss how the designs represent Canada.

Ask the children to name things that they regard as symbols of Canada. They may suggest the RCMP, the Parliament Buildings in Ottawa, or Niagara Falls. Make a collage of pictures of all the things that represent Canada to the children in your class.

#### 5. Our Heritage – Myths and Legends

The earliest Canadians were Indians and Eskimos. These native people often made up stories to explain things about nature or happenings in their daily lives. They believed there were special gods who looked after them and other gods who were harmful. These stories are called *legends*, and were often about the gods in which the native people believed. The stories have been passed down by word of mouth and many of them have now been printed in books so that more people can enjoy them.

Read some Canadian Indian or Eskimo legends to the children. After they have heard many samples of Canadian legends, challenge them to create legends of their own. They may choose characters from the stories they have heard. Make a class book entitled “Legends of Canada”.

## MATHEMATICS ACTIVITIES

### 1. Sizes of the Provinces

Refer to the map of Canada. Examine the size of each province. Discuss which province is the largest and which is the smallest. List the names of the provinces in order from largest to smallest. If provinces appear to be of about the same size, ask the children to suggest ways of finding out which is the larger (largest).

You may wish to have the children cover each province on a map of Canada with one-centimetre squares. Then the number of squares required can be arranged to show the provinces from largest to smallest. You may prefer to have the children paste the squares in rows to show a comparison of the sizes of the provinces.

### 2. Place of Birth

Make a vertical bar graph to indicate where the children in your class were born. The children may be grouped according to those born in the province, in another province, in another country.

Have the children determine whether more of them were born in Canada or in another country.

### 3. Places Visited

Make a tally chart to indicate which provinces the children in your class have visited. Have them determine which province had the most visitors from the class.

For your own province, make a list of the largest cities and towns and record with tallies how many children have visited each one.

## SCIENCE ACTIVITIES

### 1. Canadian Inventions

A surprising number of things that play an important part in our everyday lives were invented or discovered in Canada. Consider the following achievements by Canadians.

- a. The submarine telegraph cable
- b. The telephone
- c. The railway sleeping car
- d. The invention of standard time
- e. Paper made from wood fibres
- f. The commercial motion picture
- g. The electronic organ
- h. The first oil well
- i. The snowmobile
- j. The snowblower
- k. Five-pin bowling
- l. The game of basketball
- m. The game of table hockey
- n. The zipper
- o. The paint roller
- p. The chocolate bar
- q. The McIntosh apple
- r. Instant mashed potatoes
- s. Frozen fish
- t. Pabulum

Assign one of the things listed to each child. Have the children work alone or in pairs to find out and report to the class one or two interesting things about the invention or the discovery; for example, the year of the invention or the discovery, where the inventor or the discoverer lived.

Some children may be interested in adding to the list by reporting about other Canadian inventions.

Make a permanent list of the inventions so that others can be added as the children collect new information.

### 2. Endangered Wildlife

Within the last hundred years the following species have become extinct in Canada:

- the great auk
- the Queen Charlotte Island caribou
- the Labrador duck
- the eastern elk
- the sea mink
- the passenger pigeon
- the wild turkey
- the Great Plains wolf
- the Newfoundland wolf

Read to the children some facts that led to the extinction of one or more of these species.

Today there are many other species that are in danger of extinction. Have the children try to find out the names of some of these birds, fish, mammals, reptiles, and amphibians and why they are decreasing in number. For example, the bald eagle may become extinct because pesticide residues from the flesh it eats build up in its system; the Atlantic salmon is in danger because of the pollution of Canadian waters; the grizzly bear is in danger because of the decreasing wilderness areas necessary to provide food for it; toads are decreasing in number because of their habit of remaining hidden by day and coming out in the evening. As a consequence, many of them are killed crossing roads.

Discuss with the children measures that can be taken to ensure that the endangered species have a better chance for survival.

## SOCIAL STUDIES ACTIVITIES

### 1. Canadian Government

While each province has its own government, there is a Federal Government that looks after all Canadians. The Members of Parliament are elected by the people to pass laws that will protect all Canadians. Discuss the concepts of elections and laws. Have the children give some examples of laws that are familiar to them.

The head of the Federal Government is called the Prime Minister. Show a picture of the Prime Minister and discuss some of his duties.

The Federal Government is located in the city of Ottawa. Locate Ottawa on the map and relate this to where your school is located. Discuss how you would travel to Ottawa to visit the Parliament Buildings, which are illustrated on pages 242 and 243. Have the children discuss their impressions of the Parliament Buildings.

Have the children write a brief account of Canadian government, telling about the Prime Minister, the Parliament Buildings, and the purpose of government. Have each child suggest a law that he/she would propose if he/she were a Member of Parliament.

### 2. Geographical Features of Canada

Canada has a variety of terrains and landscapes. Take the children on an imaginary trip across Canada to study the geographical features that make the country unique. Use films, photographs, and pictures to illustrate these features.



Begin on the west coast of Canada. Discuss how you will get to Vancouver—whether you are close enough to drive by car or whether you will have to go by airplane or by train. Some of the features to discuss are given below:

- a. the beaches and rugged isolation of the Pacific coast
- b. the snowcapped peaks of the Rocky Mountains
- c. the mysterious rolling foothills
- d. the vastness and flatness of the Prairies
- e. the heavily wooded and rocky regions of northern Ontario
- f. the rich farmland of southern Ontario
- g. the Great Lakes and the St. Lawrence Seaway
- h. the Laurentian Mountains
- i. the beaches and coves of the Atlantic coast

Display pictures drawn by the children that typify the geography of your region or parts of Canada that they have visited.

### 3. Unique Features of Canada

The children may be impressed to know that there are many man-made or natural features in Canada that rank longest, or highest, or largest when compared with those in other countries. Each province has one or more features that rank first in the world. Canada can boast of having the world's

- a. largest national park
- b. highest tides
- c. longest skating rink
- d. largest curling rink
- e. longest roller coaster
- f. largest winter carnival
- g. tallest totem pole
- h. largest ranch
- i. largest bay
- j. most northerly settlement
- k. only U.F.O. landing pad
- l. tallest freestanding structure
- m. largest airport
- n. largest island
- o. foggiest place
- p. longest street
- q. longest artificial seaway
- r. largest producer of maple syrup
- s. Tuna capital
- t. oldest chain store

Assign some of these features to children in small groups and have them try to discover in which province or territory each feature is located. In their research the children may discover other features that rank first in the world. Include these on the list. Some children may become so enthusiastic that they will try to extend the list to thirty, or forty, or even fifty features. Encourage such enthusiasm because it will lead not only to a background of factual information but also to a sense of pride in being a Canadian.

### 4. Famous Canadians

To make the children aware of the contributions that some Canadians have made not only to Canada but also to the rest of the world, write the following names on chart paper.

|                       |                   |
|-----------------------|-------------------|
| Sir John A. Macdonald | Pierre Berton     |
| Alexander Graham Bell | Maureen Forrester |
| Timothy Eaton         | Bobby Orr         |
| Stephen Leacock       | Gordon Lightfoot  |
| Emily Carr            | Anne Murray       |
| Norman Bethune        | Terry Fox         |

Ask the children to think of the names of other famous Canadians that could be added to the list.

Assign one name to either one or two children. Have them find out why each person was or is noteworthy and report their findings to the class. Have the children discuss why each of the persons is worthy of a place in the history of Canada.

## ART ACTIVITIES

### 1. Artists of Canada

If possible, take the children in your class to visit an art gallery where they can view the works of Canadian artists and painters. If this is not possible, obtain books of paintings from the public library. One good source for illustrations is *Painting in Canada, a History* by J. Russell Harper. Acquaint the children with the names of some of the better known Canadian artists and painters. Discuss the style and technique used by, say, one of the Group of Seven, or Emily Carr, or Alex Colville.

Select other books to show the work of wildlife artists such as Robert Bateman, Alan Brook, J. Fenwick Landsdowne, Robert Phinney, and Terence Michael Shortt. Also, show prints of Inuit art and have the children try to interpret them.

### 2. Mural of Canada

Draw a large outline map of Canada on mural paper. Assign the children to small groups—one for each region of Canada. Discuss what significant feature should be shown for each province, for example, fishing off the coast of Newfoundland, the Parliament Buildings in Ottawa, lumbering in British Columbia.

## MOVEMENT ACTIVITIES

### 1. Physical Fitness

The Ministry of Health and Welfare has designed a program to encourage physical fitness. It includes tests and exercises to determine and extend levels of fitness. Schools are being encouraged to participate in the fitness program for Canadian children. Information can be obtained by writing to the office of the Ministry of Health and Welfare in Ottawa.

## MUSIC ACTIVITIES

### 1. Songs of Canada

Several songs deal with Canada as a nation. Teach the children the song “This Land Is Your Land”. Locate on a map the places in the song. The song “Canada” by Bobby Gimby is one that captures the joy of being Canadian. Your children will also enjoy singing this song.

Have the children listen to songs that mention different regions of Canada; for example, “Farewell to Nova Scotia”, “Something to Sing About”, “Blow Ye Winds”. One good source for such songs is *Canada Is . . . Music*, compiled, edited, and written by Dulcie Colby, John Harrison, and Carol Kerr, published in 1980 by Gordon V. Thompson, Toronto. Another good source is *Song to a Seagull*, edited by Robert Evans. Although the book is out of print, you may be able to find a copy in your public library.

There are many traditional folk songs representing different parts of Canada. Ones that are suitable for young children are “I’s the B’y That Builds the Boat”, “Alouette!”, “Donkey Riding”, “Bonhomm”, “Bonhomm”, and “Jack Was Every Inch a Sailor”.

## Unit 12

Use your tangram pieces.

Cover each shape with a matching piece.

Then find two pieces that will cover each shape.

Use the five pieces to cover shape A.

Which do you think is larger, shape A or shape B? \_\_\_\_

Will the five pieces cover shape B? \_\_\_\_ *Answers will vary.*

Comparing areas of geometric shapes

(two hundred thirty-five) 235

## LESSON OUTCOME

Compare areas of geometric shapes

## Materials

plastic or cardboard tangram pieces for each child, a copy of page T348 for each child

## Vocabulary

tangram, parallelogram (optional)

## Background

• The tangram is a puzzle made up of seven pieces that can be put together in an extraordinary variety of ways. Store the tangram pieces in envelopes for the children to use in their spare time during the day and also before and after school. If you do not have commercial tangrams, use the pattern on page T347 to make cardboard tangram pieces.

## RELATED ACTIVITIES

• Trace around several tangram pieces to form pairs of shapes similar to those on page 235. Have the children estimate which shape in each pair is larger and then fit the pieces together to check their decision.

## LESSON ACTIVITY

## Before Using the Page

• It is important to let the children have time for free exploration with the tangram pieces, fitting them together to make shapes and placing smaller pieces on top of larger ones to compare size and shape. Ask the following questions:

“Can you make a square shape using the two large triangular pieces? the two small triangular pieces?”

“How many of the small square shapes would cover the large square shape?”

“How many small triangular pieces can cover the small square piece?”

• After the children are quite familiar with the pieces, encourage them to form a picture and to trace around the pieces. The children may exchange these pictures and try to place their tangram pieces to form the picture. A picture may be that of a house, a boat, an arrow, a horse, and so on.

• Ask the children to choose only four of the tangram pieces, for example. Have them make as many different shapes as they

can, using only those pieces. Some examples are given on page T348. You may wish to give the children copies of page T348 and have them use the four pieces indicated to form each of the shapes. The dotted lines should not be provided for the children; they should draw their own lines as they solve each puzzle.

## Using the Page

• Read the instructions to the children. Have them cover each of the three shapes at the top of the page with the matching piece. You may wish to introduce the term *parallelogram* at this time. Then have the children remove the three pieces and try to cover each of the three shapes using two smaller shapes (the two small triangular pieces). Have the children draw lines to show how the two pieces fit each shape. Now have them use the five pieces they have just considered to cover shape A. You may wish to advise them to position the larger tangram pieces first and then the smaller ones. Have them write their answer to the first question before they try to cover shape B. They will notice that they would need one more small triangular piece to completely cover shape B, and thus shape B is larger than shape A.



## LESSON OUTCOME

Add three-digit numbers, no regrouping, sums to 999

### Materials

odometer device as described on page T275, flip chart for each child, models for hundreds, tens, and ones, a sheet of paper marked to show columns for hundreds, tens, and ones for children who need help

## RELATED ACTIVITIES

- You may wish to adapt the third of the activities suggested in *Before Using the Page* on page T155 and have children work in pairs using 9 hundreds, 9 tens, 9 ones, and an abacus chart ruled into three columns.

Complete.



| hundreds | tens     | ones     |
|----------|----------|----------|
| 2        | 4        | 5        |
| + 3      | 2        | 2        |
| <b>5</b> | <b>6</b> | <b>7</b> |

| h        | t        | o        |
|----------|----------|----------|
| 2        | 4        | 5        |
| + 3      | 2        | 2        |
| <b>5</b> | <b>6</b> | <b>7</b> |



| h        | t        | o        |
|----------|----------|----------|
| 3        | 1        | 5        |
| + 2      | 4        | 3        |
| <b>5</b> | <b>5</b> | <b>8</b> |

| h        | t        | o        |
|----------|----------|----------|
| 3        | 1        | 5        |
| + 2      | 4        | 3        |
| <b>5</b> | <b>5</b> | <b>8</b> |

| h        | t        | o        |
|----------|----------|----------|
| 5        | 3        | 2        |
| + 1      | 4        | 5        |
| <b>6</b> | <b>7</b> | <b>7</b> |

| h        | t        | o        |
|----------|----------|----------|
| 1        | 4        | 6        |
| + 2      | 1        | 2        |
| <b>3</b> | <b>5</b> | <b>8</b> |

| h        | t        | o        |
|----------|----------|----------|
| 4        | 6        | 0        |
| + 4      | 3        | 9        |
| <b>8</b> | <b>9</b> | <b>9</b> |

| h        | t        | o        |
|----------|----------|----------|
| 3        | 0        | 4        |
| + 5      | 3        | 5        |
| <b>8</b> | <b>3</b> | <b>9</b> |

|          |          |          |
|----------|----------|----------|
| 3        | 2        | 0        |
| + 6      | 6        | 4        |
| <b>9</b> | <b>8</b> | <b>4</b> |

|          |          |          |
|----------|----------|----------|
| 5        | 0        | 0        |
| + 4      | 0        | 0        |
| <b>9</b> | <b>0</b> | <b>0</b> |

|          |          |          |
|----------|----------|----------|
| 2        | 6        | 2        |
| + 1      | 0        | 4        |
| <b>3</b> | <b>6</b> | <b>6</b> |

|          |          |          |
|----------|----------|----------|
| 3        | 0        | 0        |
| + 3      | 5        | 0        |
| <b>6</b> | <b>5</b> | <b>0</b> |

|          |          |          |
|----------|----------|----------|
| 8        | 2        | 5        |
| + 1      | 7        | 0        |
| <b>9</b> | <b>9</b> | <b>5</b> |

|          |          |          |
|----------|----------|----------|
| 4        | 7        | 2        |
| + 3      | 0        | 2        |
| <b>7</b> | <b>7</b> | <b>4</b> |

|          |          |          |
|----------|----------|----------|
| 7        | 8        | 6        |
| + 2      | 0        | 1        |
| <b>9</b> | <b>8</b> | <b>7</b> |

|          |          |          |
|----------|----------|----------|
| 3        | 7        | 1        |
| + 1      | 1        | 5        |
| <b>4</b> | <b>8</b> | <b>6</b> |

|          |          |          |
|----------|----------|----------|
| 1        | 2        | 5        |
| + 1      | 3        | 2        |
| <b>2</b> | <b>5</b> | <b>7</b> |

|          |          |          |
|----------|----------|----------|
| 1        | 1        | 9        |
| + 7      | 6        | 0        |
| <b>8</b> | <b>7</b> | <b>9</b> |

|          |          |          |
|----------|----------|----------|
| 1        | 4        | 0        |
| + 3      | 0        | 8        |
| <b>4</b> | <b>4</b> | <b>8</b> |

|          |          |          |
|----------|----------|----------|
| 5        | 0        | 4        |
| + 3      | 6        | 2        |
| <b>8</b> | <b>6</b> | <b>6</b> |

236 (two hundred thirty-six)

Adding three-digit numbers, no regrouping



## LESSON ACTIVITY

### Before Using the Page

- If you prepared the odometer device described on page T275, use it now to review three-digit numbers. Display a number and ask a child to read it. Have children state how many ones, tens, and hundreds there are. Repeat for other numbers.

State a three-digit number and have a child show the number on the odometer device. Ask for numbers that are one greater than and ten greater than (one less than and ten less than) the given number. Repeat for other numbers.

- Have children use their flip charts to respond to these: "Show 458. Show the number that is three greater than 458." "Show a number that has 2 tens. Show the number that is 10 less."

- Write  $14 + 23$  in vertical form on the chalkboard. Ask a child to write the sum. Then write  $314 + 123$  in vertical form on the chalkboard. Have children tell how the two exercises are similar

|     | h | t | o |
|-----|---|---|---|
|     | 3 | 1 | 4 |
| + 1 |   | 2 | 3 |

and how they are different. Have children draw vertical lines to separate the three columns of numerals and use a heading for each column to indicate the place value. Have children demonstrate the sum using models of hundreds, tens, and ones and write the numeral on the chalkboard. For other similar examples, have the children complete the sums without using models and then use models to check the sums.

- Write several addition exercises on the chalkboard. Give children who need help a sheet ruled for writing three-digit numbers. Have the children copy and complete each exercise. Have children write the answer on the chalkboard. Ask a child to read each exercise, for example, "Three hundred fourteen plus one hundred twenty-three equals four hundred thirty-seven."

### Using the Page

- Have children interpret the models shown at the top of the page in relation to the completed exercise. Have them complete the second exercise and discuss it in a similar way. Then let the children work independently.

## LESSON OUTCOME

Add three-digit numbers, no regrouping, sums to 999

### Materials

models for hundreds, tens, and ones, place-value pocket chart for representing three-digit numbers, sticks, three-place abacus

### RELATED ACTIVITIES

- You may wish to have children read the addends and sums on page 237 to give them practice in reading three-digit numbers. You may also give instructions of the following types:
  - "Read a sum that has zero in the ones' place."
  - "Read a sum that has zero in the tens' place."
  - "Read a sum that is greater than 900."
  - "Read a sum that is between 700 and 900."
- Have the children complete addition exercises arranged as shown.

|   |   |     |    |   |     |
|---|---|-----|----|---|-----|
| + | → |     |    |   |     |
| ↓ |   | 300 | 50 | 1 | 351 |
|   |   | 200 | 20 | 6 | 226 |
|   |   | 500 | 70 | 7 | 577 |

|   |   |     |    |   |  |
|---|---|-----|----|---|--|
| + | → |     |    |   |  |
| ↓ |   | 400 | 20 | 3 |  |
|   |   | 100 | 30 | 4 |  |
|   |   |     |    |   |  |

234 hours standing guard  
145 hours standing guard  
How many hours standing guard?

Complete.

$$\begin{array}{r} 237 \\ + 422 \\ \hline 659 \end{array}$$

$$\begin{array}{r} 324 \\ + 73 \\ \hline 397 \end{array}$$

$$\begin{array}{r} 425 \\ + 130 \\ \hline 555 \end{array}$$

$$\begin{array}{r} 400 \\ + 400 \\ \hline 800 \end{array}$$

$$\begin{array}{r} 281 \\ + 411 \\ \hline 692 \end{array}$$

$$\begin{array}{r} 430 \\ + 60 \\ \hline 490 \end{array}$$

$$\begin{array}{r} 436 \\ + 312 \\ \hline 748 \end{array}$$

$$\begin{array}{r} 695 \\ + 304 \\ \hline 999 \end{array}$$

$$\begin{array}{r} 500 \\ + 300 \\ \hline 800 \end{array}$$

$$\begin{array}{r} 141 \\ + 350 \\ \hline 491 \end{array}$$

$$\begin{array}{r} 301 \\ + 87 \\ \hline 388 \end{array}$$

$$\begin{array}{r} 332 \\ + 652 \\ \hline 984 \end{array}$$

$$\begin{array}{r} 631 \\ + 326 \\ \hline 957 \end{array}$$

$$\begin{array}{r} 208 \\ + 621 \\ \hline 829 \end{array}$$

$$\begin{array}{r} 413 \\ + 285 \\ \hline 698 \end{array}$$

$$\begin{array}{r} 540 \\ + 144 \\ \hline 684 \end{array}$$

$$\begin{array}{r} 125 \\ + 604 \\ \hline 727 \end{array}$$

$$\begin{array}{r} 276 \\ + 510 \\ \hline 786 \end{array}$$

$$\begin{array}{r} 500 \\ + 206 \\ \hline 706 \end{array}$$

$$\begin{array}{r} 632 \\ + 131 \\ \hline 763 \end{array}$$

$$\begin{array}{r} 650 \\ + 319 \\ \hline 969 \end{array}$$

$$\begin{array}{r} 710 \\ + 243 \\ \hline 953 \end{array}$$

$$\begin{array}{r} 185 \\ + 200 \\ \hline 385 \end{array}$$

$$\begin{array}{r} 501 \\ + 472 \\ \hline 973 \end{array}$$

Adding three-digit numbers, no regrouping

(two hundred thirty-seven) 237

## LESSON ACTIVITY

### Before Using the Page

- Extend the place-value pocket chart suggested on page T159 to include a hundreds' place.

|          |      |      |
|----------|------|------|
| hundreds | tens | ones |
|          |      |      |

Write an addition exercise on the chalkboard. Have a child represent the first number using models of hundreds, tens, and ones. Have another child place sticks in the pockets of the place-value chart to represent this number. Repeat the procedure for the second addend. Have a child join the two sets of models and state how many hundreds, tens, and ones there are. Have

another child count the sticks in each pocket of the place-value chart and compare the results with the first one obtained. Have a child insert numeral cards to indicate the number of sticks in each pocket. Write the answer on the chalkboard. For other exercises, it may not be necessary to use the models, only the pocket chart.

- Demonstrate how to add two three-digit numbers (no regrouping) on a three-place abacus. Write an exercise on the chalkboard. Have children place the beads on the proper wires to represent the addends and then find the sum. Repeat for several other exercises.

### Using the Page

- Read the problem to the children and discuss the completed exercise. Have the children work independently on the page. Let the children draw lines to separate the columns if necessary. Children may need to be reminded to add the columns in the order ones, tens, and hundreds. This will prepare them for adding three-digit numbers where regrouping is necessary.



## LESSON OUTCOME

Subtract three-digit numbers, no regrouping, minuends to 999

## Materials

models for hundreds, tens, and ones, a sheet of paper marked to show columns for hundreds, tens, and ones for children who need help

## RELATED ACTIVITIES

• Ask questions similar to the following and have children use models to represent the numbers. Then have them write the numerals.

“What number has zero hundreds, zero tens, six ones?”

“What number has zero hundreds, five tens, zero ones?”

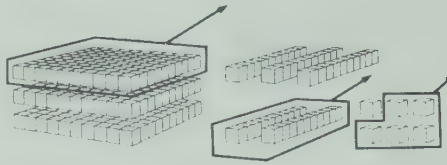
“What number has four hundreds, zero tens, zero ones?”

“What number has six hundreds, zero tens, four ones?”

“What number has five hundreds, two tens, zero ones?”

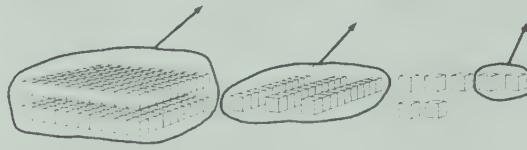
“What number has zero hundreds, six tens, four ones?”

Complete.



| hundreds | tens | ones |
|----------|------|------|
| 3        | 5    | 6    |
| - 1      | 2    | 5    |
| 2        | 3    | 1    |

| h   | t | o |
|-----|---|---|
| 3   | 5 | 6 |
| - 1 | 2 | 5 |
| 2   | 3 | 1 |



| h   | t | o |
|-----|---|---|
| 2   | 3 | 7 |
| - 2 | 3 | 2 |
|     |   | 5 |

| h   | t | o |
|-----|---|---|
| 2   | 3 | 7 |
| - 2 | 3 | 2 |
|     |   | 5 |

| h   | t | o |
|-----|---|---|
| 3   | 8 | 6 |
| - 2 | 1 | 4 |
| 1   | 7 | 2 |

| h   | t | o |
|-----|---|---|
| 4   | 7 | 5 |
| - 1 | 6 | 5 |
| 3   | 1 | 0 |

| h   | t | o |
|-----|---|---|
| 6   | 9 | 7 |
| - 6 | 7 | 5 |
|     | 2 | 2 |

| h   | t | o |
|-----|---|---|
| 7   | 8 | 4 |
| - 7 | 5 | 4 |
|     | 3 | 0 |

| h   | t | o |
|-----|---|---|
| 7   | 4 | 9 |
| - 3 | 3 | 4 |
| 4   | 1 | 5 |

| h   | t | o |
|-----|---|---|
| 9   | 4 | 5 |
| - 6 | 2 | 3 |
| 3   | 2 | 2 |

| h   | t | o |
|-----|---|---|
| 7   | 8 | 9 |
| - 4 | 4 | 5 |
| 3   | 4 | 4 |

| h   | t | o |
|-----|---|---|
| 8   | 5 | 8 |
| - 6 | 4 | 8 |
| 2   | 1 | 0 |

| h   | t | o |
|-----|---|---|
| 9   | 5 | 6 |
| - 2 | 1 | 2 |
| 7   | 4 | 4 |

| h   | t | o |
|-----|---|---|
| 8   | 0 | 0 |
| - 2 | 0 | 0 |
| 6   | 0 | 0 |

| h   | t | o |
|-----|---|---|
| 8   | 9 | 2 |
| - 7 | 3 | 0 |
| 1   | 6 | 2 |

| h   | t | o |
|-----|---|---|
| 7   | 9 | 6 |
| - 1 | 9 | 3 |
| 6   | 0 | 3 |

| h   | t | o |
|-----|---|---|
| 9   | 8 | 9 |
| - 1 | 3 | 8 |
| 8   | 5 | 1 |

| h   | t | o |
|-----|---|---|
| 8   | 6 | 4 |
| - 6 | 0 | 1 |
| 2   | 6 | 3 |

| h   | t | o |
|-----|---|---|
| 6   | 5 | 2 |
| - 1 | 3 | 1 |
| 5   | 2 | 1 |

| h | t | o |
|---|---|---|
| 3 | 7 | 0 |
| - | 2 | 0 |
| 3 | 5 | 0 |

| h   | t | o |
|-----|---|---|
| 9   | 0 | 0 |
| - 3 | 0 | 0 |
| 6   | 0 | 0 |

| h   | t | o |
|-----|---|---|
| 9   | 5 | 7 |
| - 4 | 2 | 3 |
| 5   | 3 | 4 |

| h   | t | o |
|-----|---|---|
| 8   | 0 | 6 |
| - 3 | 0 | 2 |
| 5   | 0 | 4 |

| h   | t | o |
|-----|---|---|
| 7   | 6 | 8 |
| - 4 | 3 | 1 |
| 3   | 3 | 7 |

238 (two hundred thirty-eight)

Subtracting three-digit numbers, no regrouping



## LESSON ACTIVITY

## Before Using the Page

• Write  $67 - 24$  in vertical form on the chalkboard. Have a child write the answer on the chalkboard. Write  $267 - 124$  in vertical form on the chalkboard.

Have children tell how the two exercises are similar and how they are different. Draw vertical lines to indicate the place-value columns.

| h   | t | o |
|-----|---|---|
| 2   | 6 | 7 |
| - 1 | 2 | 4 |

Some children may be able to subtract without using models, except as a check. For other children, display models of hundreds, tens, and ones. Have a child represent the first number. Have a second child remove the necessary hundreds, tens, and ones. Have a third child count the hundreds, tens, and ones remaining. Have a fourth child write the numerals on the chalkboard. Repeat the procedure as often as you think necessary.

• Write several subtraction exercises on the chalkboard. Give children who need help a sheet ruled for writing three-digit numbers. Have the children copy and complete each exercise.

Have children write the answers on the chalkboard. Ask other children to read each completed exercise.

## Using the Page

• Have children interpret the models shown at the top of the page in relation to the completed exercise. Have them complete the second exercise and then discuss it in a similar way.

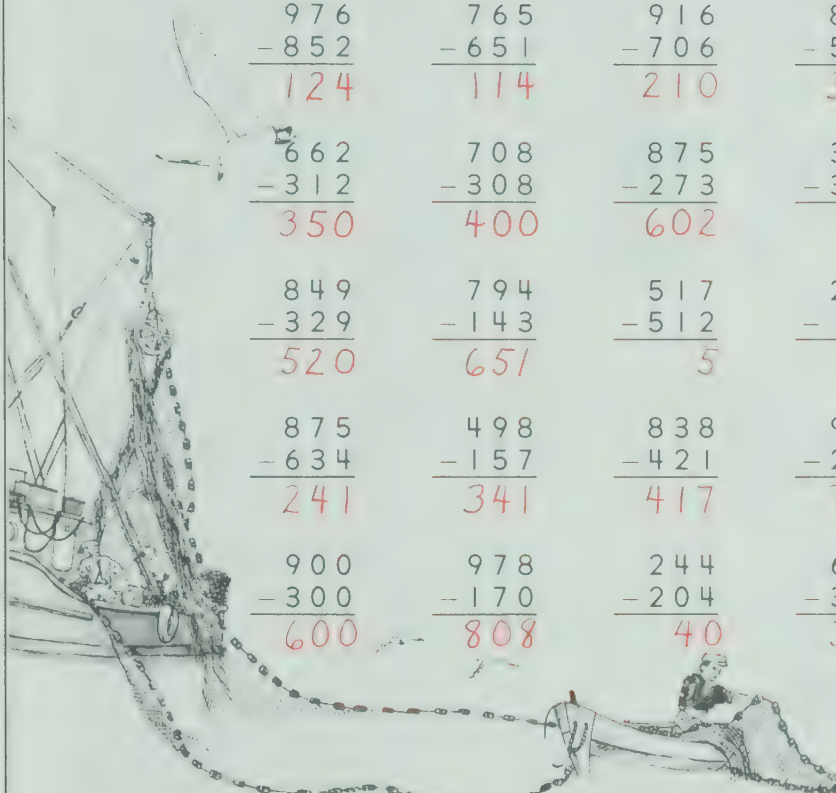
Some children become confused about when and when not to write zeros. If this happens, use models to demonstrate. Ask the children to count how many of each are left in the second exercise. There are 0 hundreds, 0 tens, and 5 ones. In other words, only 5 ones are left. Ask what number 5 ones is and have the children write it in the appropriate place. It may be necessary to spend a few minutes having children write the standard numerals for numbers stated as hundreds, tens, and ones. Some examples are given in *Related Activities*.

Have the children complete the exercises independently. Let the children draw lines to separate the columns, if necessary.

965 fish in one net  
342 fish in another net  
How many more fish are there in the first net?

| h | t | o |
|---|---|---|
| 9 | 6 | 5 |
| - | 3 | 4 |
| 6 | 2 | 3 |

Complete.



|   |   |   |   |
|---|---|---|---|
| $\begin{array}{r} 976 \\ - 852 \\ \hline 124 \end{array}$ | $\begin{array}{r} 765 \\ - 651 \\ \hline 114 \end{array}$ | $\begin{array}{r} 916 \\ - 706 \\ \hline 210 \end{array}$ | $\begin{array}{r} 800 \\ - 500 \\ \hline 300 \end{array}$ |
| $\begin{array}{r} 662 \\ - 312 \\ \hline 350 \end{array}$ | $\begin{array}{r} 708 \\ - 308 \\ \hline 400 \end{array}$ | $\begin{array}{r} 875 \\ - 273 \\ \hline 602 \end{array}$ | $\begin{array}{r} 341 \\ - 341 \\ \hline 0 \end{array}$   |
| $\begin{array}{r} 849 \\ - 329 \\ \hline 520 \end{array}$ | $\begin{array}{r} 794 \\ - 143 \\ \hline 651 \end{array}$ | $\begin{array}{r} 517 \\ - 512 \\ \hline 5 \end{array}$   | $\begin{array}{r} 209 \\ - 106 \\ \hline 103 \end{array}$ |
| $\begin{array}{r} 875 \\ - 634 \\ \hline 241 \end{array}$ | $\begin{array}{r} 498 \\ - 157 \\ \hline 341 \end{array}$ | $\begin{array}{r} 838 \\ - 421 \\ \hline 417 \end{array}$ | $\begin{array}{r} 935 \\ - 215 \\ \hline 720 \end{array}$ |
| $\begin{array}{r} 900 \\ - 300 \\ \hline 600 \end{array}$ | $\begin{array}{r} 978 \\ - 170 \\ \hline 808 \end{array}$ | $\begin{array}{r} 244 \\ - 204 \\ \hline 40 \end{array}$  | $\begin{array}{r} 695 \\ - 322 \\ \hline 373 \end{array}$ |

Subtracting three-digit numbers, no regrouping

(two hundred thirty-nine) 239

## LESSON OUTCOME

Subtract three-digit numbers, no regrouping, minuends to 999

## Materials

place-value pocket chart, sticks, three-place abacus

## RELATED ACTIVITIES

- You may wish to have the children work in pairs using 9 hundreds, 9 tens, and 9 ones on an abacus chart ruled into three columns. Adapt the first of *Related Activities* described on page T172.
- Have the children complete tables similar to the following:

|     |    |   |     |
|-----|----|---|-----|
| → + |    |   |     |
| 600 | 70 | 7 | 677 |
| 200 | 30 | 2 | 232 |
| 400 | 40 | 5 | 445 |

- You may wish to have the children complete addition and subtraction exercises in which there are missing digits to be determined.

|   |   |   |
|---|---|---|
| $\begin{array}{r} 234 \\ + 1 \square \square \\ \hline 376 \end{array}$ | $\begin{array}{r} 421 \\ + \square 3 \square \\ \hline 658 \end{array}$ | $\begin{array}{r} 356 \\ + \square \square 2 \\ \hline 698 \end{array}$ |
|---|---|---|

|   |   |   |
|---|---|---|
| $\begin{array}{r} 269 \\ - 1 \square 4 \\ \hline 135 \end{array}$ | $\begin{array}{r} 548 \\ - 2 \square \square \\ \hline 306 \end{array}$ | $\begin{array}{r} 362 \\ - \square 1 \square \\ \hline 250 \end{array}$ |
|---|---|---|

Have the children check their answers by using subtraction to check addition and addition to check subtraction.

## LESSON ACTIVITY

### Before Using the Page

- Write  $675 - 254$  in vertical form on the chalkboard. Demonstrate the subtraction procedure using the place-value pocket chart. Have a child place sticks in the pockets to represent 675. Have a second child remove sticks for 254. Have a third child count the sticks remaining in each pocket of the chart. Another child may write the answer on the chalkboard to complete the exercise.

You may wish to review how to check subtraction using addition. Write the addition exercise on the chalkboard.

|   |   |
|---|---|
| $\begin{array}{r} 675 \\ - 254 \\ \hline 421 \end{array}$ | $\begin{array}{r} 421 \\ + 254 \\ \hline 675 \end{array}$ |
|---|---|

Have children demonstrate the sum by replacing the sticks for 254 in the pocket chart. Use other similar examples.

- Demonstrate how to subtract two three-digit numbers (no regrouping) on a three-place abacus. Write an exercise on the chalkboard. Have children place and remove beads to represent

the numbers and then state the answer. Remind the children that they should always start with the ones' column. Repeat for other exercises similar to the following.

|   |   |   |   |   |
|---|---|---|---|---|
| $\begin{array}{r} 346 \\ - 342 \\ \hline \end{array}$ | $\begin{array}{r} 438 \\ - 132 \\ \hline \end{array}$ | $\begin{array}{r} 700 \\ - 300 \\ \hline \end{array}$ | $\begin{array}{r} 453 \\ - 453 \\ \hline \end{array}$ | $\begin{array}{r} 682 \\ - 632 \\ \hline \end{array}$ |
|---|---|---|---|---|

### Using the Page

- Read the problem to the children and discuss the completed exercise. Have the children work independently on the page. Let the children draw lines to separate the columns, if necessary.



LESSON OUTCOME

Choose the coins needed for a given amount

Materials

real money, play money, or coin cutouts from copies of page T327, a copy of the special chart for each child

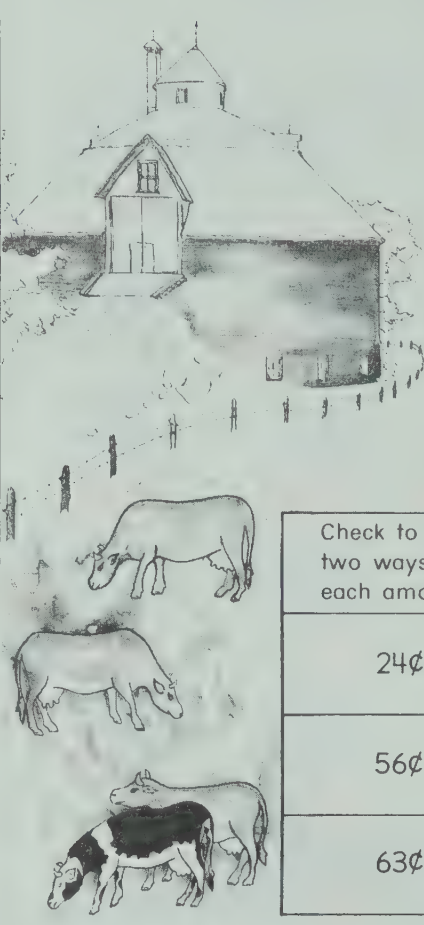
RELATED ACTIVITIES

- Prepare a work sheet showing sets of coins that are not the fewest coins possible for given amounts. Have the children ring two or more coins that can be replaced by a single coin and then show the fewest coins needed for each amount.
- Prepare copies of the chart shown and give one to each child.

| I pay | 25¢ | 10¢ | 5¢ | 1¢ |
|-------|-----|-----|----|----|
|       |     |     |    |    |

Have the children use the play store or the store chart. Have them select an item to buy and record the amount in the first column. Have them select and then indicate in the appropriate columns which coins would be used to pay for the item using the fewest coins. Items in the play store or on the store chart may show prices for amounts to \$1.99. You may consider including a column in the chart above for a one-dollar bill.

What coins do you need ?  
Use the fewest coins for each.



|        |      |    |   |     |
|--------|------|----|---|-----|
| 28¢    | ✓    |    |   | ✓✓✓ |
| 37¢    | ✓    | ✓  |   | ✓✓  |
| 19¢    |      | ✓  | ✓ | ✓✓✓ |
| 55¢    | ✓✓   |    | ✓ |     |
| 46¢    | ✓    | ✓✓ |   | ✓   |
| 61¢    | ✓✓   | ✓  |   | ✓   |
| 84¢    | ✓✓✓  |    | ✓ | ✓✓✓ |
| 72¢    | ✓✓   | ✓✓ |   | ✓✓  |
| 93¢    | ✓✓✓  | ✓  | ✓ | ✓✓✓ |
| \$1.26 | ✓✓✓✓ |    |   | ✓   |

Answers will vary.

|   |  |  |  |  |
|---|--|--|--|--|
| Check to show two ways to make each amount. |  |  |  |  |
| 24¢   |  |  |  |  |
| 56¢   |  |  |  |  |
| 63¢   |  |  |  |  |

240 (two hundred forty)

Choosing coins worth a given amount

LESSON ACTIVITY

Before Using the Page

- Have children count by fives, tens, and twenty-fives to 100. Then ask, “What number is ten greater than 25? ten greater than 35? three greater than 40?”
- Ask the children to show coins worth 12¢. Have several children tell the number of coins used and what these coins were. Record the results in a chart as indicated below. Ask which method uses the fewest coins and ring the corresponding row in the chart.

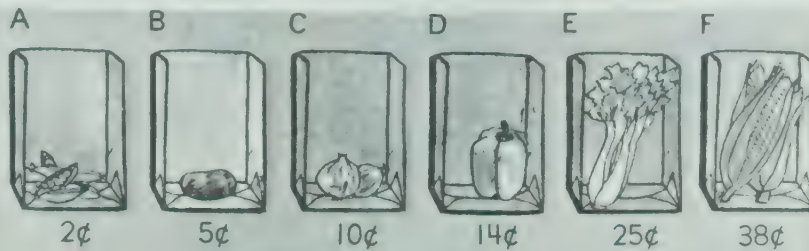
|     | 25¢ | 10¢ | 5¢ | 1¢       |
|-----|-----|-----|----|----------|
| 12¢ |     |     | ✓✓ | ✓✓       |
|     |     | ✓   |    | ✓✓       |
|     |     |     | ✓  | ✓✓✓✓✓    |
|     |     |     |    | ✓✓✓✓✓✓✓✓ |

Ask the children to show the fewest coins needed for 15¢, 16¢, 20¢, 23¢, and 25¢ in that order. Show the results in a chart. Then, ask for one other way of showing coins for each amount.

Have the children use their coins to determine the fewest coins needed for amounts greater than 25¢. Use the following procedure to help the children. For 67¢, for example, ask, “Can we use a quarter? How much is that?” Make a check in the column for 25¢. “Can we use another quarter? How much do we have now?” Make another check in the column for 25¢. “Can we use another quarter? Why not? Can we use a dime? How much do we have now?” Make a check in the column for 10¢. “Can we use another dime? Why not? What shall we try next?” Make a check in the column for 5¢ and ask, “How much do we have now? What else do we need?” Make two checks in the column for 1¢. Have the children review the coins checked and add the values starting from the coins having the greatest value.

Using the Page

- Read the instructions at the top of the page. Discuss the first exercise with the children. Have them trace over the checks shown for 28¢. Emphasize that for this chart, the fewest coins are to be shown for each amount. Then point out that for the second chart, they are to show two ways to make each amount.



Complete.

| You have | You buy | You pay                | Your change      |
|----------|---------|------------------------|------------------|
|          | 4 of A  | $4 \times 2 = 8$ 8¢    | 2¢               |
|          | 3 of B  | $3 \times 5 = 15$ 15¢  | 5¢               |
|          | 2 of C  | $2 \times 10 = 20$ 20¢ | 5¢               |
|          | C and B | $10 \times 5 = 15$ 15¢ | 10¢              |
|          | 6 of B  | $6 \times 5 = 30$ 30¢  | 30¢              |
|          | E and C | $25 + 10 = 35$ 35¢     | Not enough money |
|          | F, C, A | $38 + 10 + 2 = 50$ 50¢ | No change        |
|          | D, C, B | $14 + 10 + 5 = 29$ 29¢ | 21¢              |

Making change amounts to 50 cents

(two hundred forty-one) 241

## LESSON OUTCOME

Make change for amounts to 50 cents

## Materials

real money, play money, or coin cutouts from copies of page T327, pictures of sets of coins (optional), objects marked with prices of 2¢, 5¢, 9¢, 10¢, 13¢, 23¢, 34¢

## RELATED ACTIVITIES

- Ask the children to choose sets of coins different from those shown on page 241 and having values to 50 cents. Have the children pretend to buy objects of their own choosing from those shown on the page and record the results as on page 241.

## LESSON ACTIVITY

## Before Using the Page

- Draw a chart similar to the following on the chalkboard.

|           |               |     |
|-----------|---------------|-----|
| 3 dimes   | $3 \times 10$ | 30¢ |
| 2 nickels |               |     |
| 7 nickels |               |     |
| 6 dimes   |               |     |

Ask a child to state the value of one dime. Ask another child to tell how to find the value of three dimes. Lead the child to suggest a multiplication phrase and write it as shown. Then write the total amount in the last column. Have the children complete the chart. Then have children read what is shown in each row. (Three dimes. Three times ten. Thirty cents.)

- Display sets of coins or pictures of sets of coins and have the children determine the value of each set.

- Display a set of objects marked with the following prices.

|    |    |    |     |     |     |     |
|----|----|----|-----|-----|-----|-----|
| A  | B  | C  | D   | E   | F   | G   |
| 2¢ | 5¢ | 9¢ | 10¢ | 13¢ | 23¢ | 34¢ |

Ask questions of the following types:

“What would you pay for six of (A)?”

“What would you pay for (A) and (E)?”

“If you have 10¢ to spend, how much change should you get if you buy (A)?”

“How much change should you get from 10¢ if you buy (A) and (B)?”

“If you have 10¢ to spend, could you buy (B) and (C)?”

“What could you buy if you had 25¢ to spend?”

The questions suggested above are designed to encourage the children to perform computations mentally.

## Using the Page

- Have the children identify the objects pictured at the top of the page and the prices shown. Discuss the completed exercise with the children. When they understand the procedure to be followed, let them work independently. You may wish to have the children first write the amounts of money shown in the column “You have” before they start to write the number sentences. Note that to buy E and C, there is not enough money.



# LESSON OUTCOME

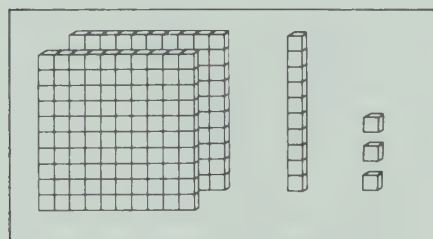
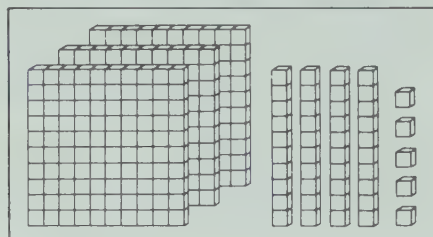
Add three-digit numbers, regrouping of ones as tens, sums to 999

## Materials

models for hundreds, tens, and ones

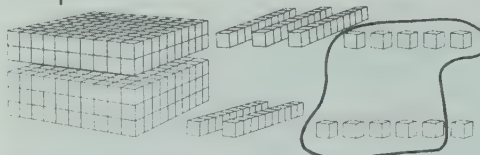
## RELATED ACTIVITIES

- You may wish to use copies of page T336 and make a set of cards showing hundreds, tens, and ones. Have the children select two cards, interpret the diagrams to form an addition exercise, and then find the sum. The numbers represented on the cards should not require regrouping of tens as hundreds.



$$\begin{array}{r} 345 \\ + 213 \\ \hline 558 \end{array}$$

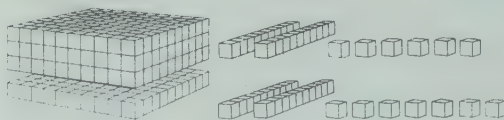
Complete.



| hundreds | tens | ones |
|----------|------|------|
| 2        | 3    | 5    |
| + 3      | 2    | 6    |
| 5        | 6    | 1    |

| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 2   | 3 | 5 |
| + 3 | 2 | 6 |
| 5   | 6 | 1 |



| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 3   | 2 | 6 |
| + 1 | 2 | 7 |
| 4   | 5 | 3 |

| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 3   | 2 | 6 |
| + 1 | 2 | 7 |
| 4   | 5 | 3 |

| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 1   | 7 | 8 |
| + 5 | 1 | 7 |
| 6   | 9 | 5 |

| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 6   | 4 | 5 |
| + 2 | 2 | 9 |
| 8   | 7 | 4 |

| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 1   | 3 | 5 |
| + 1 | 4 | 5 |
| 2   | 8 | 0 |

| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 2   | 5 | 5 |
| + 1 | 3 | 8 |
| 3   | 9 | 3 |

| h   | t | o |
|-----|---|---|
|     |   | 1 |
| 4   | 1 | 6 |
| + 5 | 6 | 9 |
| 9   | 8 | 5 |

|     |   |   |
|-----|---|---|
| 2   | 0 | 9 |
| + 5 | 8 | 7 |
| 7   | 9 | 6 |

|     |   |   |
|-----|---|---|
| 4   | 3 | 3 |
| + 4 | 5 | 9 |
| 8   | 9 | 2 |

|     |   |   |
|-----|---|---|
| 4   | 0 | 4 |
| + 3 | 4 | 7 |
| 7   | 5 | 1 |

|     |   |   |
|-----|---|---|
| 6   | 5 | 1 |
| + 1 | 2 | 9 |
| 7   | 8 | 0 |

|     |   |   |
|-----|---|---|
| 3   | 0 | 4 |
| + 6 | 0 | 8 |
| 9   | 1 | 2 |

|     |   |   |
|-----|---|---|
| 4   | 3 | 7 |
| + 3 | 9 |   |
| 4   | 7 | 6 |

|     |   |   |
|-----|---|---|
| 5   | 2 | 9 |
| + 4 | 4 | 8 |
| 9   | 7 | 7 |

|     |   |   |
|-----|---|---|
| 7   | 7 | 9 |
| + 2 | 0 | 9 |
| 9   | 8 | 8 |

|     |   |   |
|-----|---|---|
| 3   | 2 | 7 |
| + 3 | 6 | 7 |
| 6   | 9 | 4 |

|     |   |   |
|-----|---|---|
| 2   | 5 | 8 |
| + 5 | 1 | 9 |
| 7   | 7 | 7 |

|     |   |   |
|-----|---|---|
| 6   | 4 | 3 |
| + 3 | 1 | 7 |
| 9   | 6 | 0 |

|     |   |   |
|-----|---|---|
| 2   | 3 | 6 |
| + 7 | 0 | 5 |
| 9   | 4 | 1 |



242 (two hundred forty-two)

Adding three-digit numbers, regrouping

## LESSON ACTIVITY

### Before Using the Page

- Write  $35 + 27$  in vertical form on the chalkboard. Have the children copy and complete it. Have a child use models of tens and ones to demonstrate the regrouping of ten ones as one ten. Have another child indicate on the chalkboard how this is shown when writing the solution.

Write  $235 + 127$  in vertical form on the chalkboard and ask how this exercise is different from the previous one. Have a child use models of hundreds, tens, and ones to represent 235. If necessary, draw vertical lines to separate the place values. Have another child use models to represent 127. A third child may join the two sets and state the number of hundreds, tens, and ones. Ask whether any regrouping is necessary. Ask if this is the same regrouping that was necessary for the first exercise. Have a child do the regrouping required and state the number of hundreds, tens, and ones. Ask the following sequence of questions: "How many ones are being added? How many ones is this? Are there enough ones for regrouping? How many ones are left?"

How do you show the new ten? How many tens are being added? How many tens is this? How many hundreds are being added?" Write the numerals for the answers during the questioning procedure. Have a child read the three-place numeral formed.

Repeat the procedure of adding two three-digit numbers using models and explaining the process as above for other exercises.

- Write more addition exercises on the chalkboard. Have the children copy and complete them. Children should help to explain the procedure that was used. Children who have difficulty should continue to draw vertical lines to separate the place-value columns.

### Using the Page

- Have children read the three-digit numbers in the first exercise. Discuss the exercise, asking questions similar to those suggested in *Before Using the Page*. Have children explain why the models are ringed in the diagram. Have them ring ten ones in the second exercise and then complete it on their own. Discuss the answer with them and then let them work independently. Note that regrouping of tens as hundreds is not required.

357 visitors one day  
126 visitors the next day  
How many visitors came?

Complete.

| h     | t | o |
|-------|---|---|
| 3     | 5 | 7 |
| +     | 1 | 2 |
| <hr/> |   |   |
| 4     | 8 | 3 |

$$\begin{array}{r} 847 \\ + 115 \\ \hline 962 \end{array}$$

$$\begin{array}{r} 364 \\ + 129 \\ \hline 493 \end{array}$$

$$\begin{array}{r} 471 \\ + 219 \\ \hline 690 \end{array}$$

$$\begin{array}{r} 304 \\ + 408 \\ \hline 712 \end{array}$$

$$\begin{array}{r} 625 \\ + 137 \\ \hline 762 \end{array}$$

$$\begin{array}{r} 759 \\ + 238 \\ \hline 997 \end{array}$$

$$\begin{array}{r} 126 \\ + 159 \\ \hline 285 \end{array}$$

$$\begin{array}{r} 405 \\ + 346 \\ \hline 751 \end{array}$$

$$\begin{array}{r} 453 \\ + 427 \\ \hline 880 \end{array}$$

$$\begin{array}{r} 418 \\ + 29 \\ \hline 447 \end{array}$$

$$\begin{array}{r} 518 \\ + 435 \\ \hline 953 \end{array}$$

$$\begin{array}{r} 225 \\ + 168 \\ \hline 393 \end{array}$$

$$\begin{array}{r} 124 \\ + 46 \\ \hline 170 \end{array}$$

$$\begin{array}{r} 538 \\ + 124 \\ \hline 662 \end{array}$$

$$\begin{array}{r} 138 \\ + 437 \\ \hline 575 \end{array}$$

$$\begin{array}{r} 117 \\ + 577 \\ \hline 694 \end{array}$$

$$\begin{array}{r} 279 \\ + 207 \\ \hline 486 \end{array}$$

$$\begin{array}{r} 133 \\ + 658 \\ \hline 791 \end{array}$$

$$\begin{array}{r} 319 \\ + 375 \\ \hline 694 \end{array}$$

$$\begin{array}{r} 347 \\ + 646 \\ \hline 993 \end{array}$$

$$\begin{array}{r} 345 \\ + 335 \\ \hline 680 \end{array}$$

$$\begin{array}{r} 129 \\ + 59 \\ \hline 188 \end{array}$$

$$\begin{array}{r} 127 \\ + 824 \\ \hline 951 \end{array}$$

$$\begin{array}{r} 608 \\ + 48 \\ \hline 656 \end{array}$$

$$\begin{array}{r} 429 \\ + 524 \\ \hline 953 \end{array}$$

$$\begin{array}{r} 239 \\ + 736 \\ \hline 975 \end{array}$$



Adding three-digit numbers, regrouping

(two hundred forty-three) 243

## LESSON OUTCOME

Add three-digit numbers, regrouping of ones as tens, sums to 999

## Materials

models for hundreds, tens, and ones, place-value pocket chart, three-place abacus

## RELATED ACTIVITIES

- You may wish to have children help to prepare three dice as follows: a red die for ones marked 4, 5, 6, 7, 8, 9; a blue die for tens marked 0, 1, 2, 3, 4, 4; a yellow die for hundreds marked 2, 3, 4, 2, 3, 4.

The children may use the dice in the following way. Roll the dice once, place them to represent a three-digit number, and record it. Roll the dice and record another three-digit number. Find the sum of the two numbers.

- The three colored dice described above may be used merely to obtain three-digit numbers. Children can play in pairs, each rolling the dice once, placing them to form the greatest number possible, and recording the number. The player with the greater number wins a point. For this game it is not necessary to assign a place value to each colored die.

- You may wish to have children in groups of three play the game "High and Low" described on page T322.

## LESSON ACTIVITY

### Before Using the Page

- Review the procedure of adding three-digit numbers using models of hundreds, tens, and ones, the place-value pocket chart, and the abacus. Have children help to represent the addends using the different devices, regroup as required, and write the sums on the chalkboard.

### Using the Page

- Read the problem to the children and discuss the completed exercise. Then let the children work independently.



## LESSON OUTCOME

Subtract three-digit numbers, regrouping of tens as ones, minuends to 999

## Materials

models for hundreds, tens, and ones

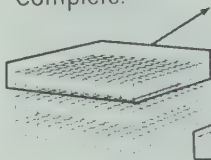
## RELATED ACTIVITIES

• You may wish to have the children use the set of cards suggested in *Related Activities* on page T312. These can be adapted for exercises involving subtraction of three-digit numbers. The numbers represented on the cards should not require regrouping from hundreds to tens, for example,

not 
$$\begin{array}{r} 435 \\ - 237 \\ \hline \end{array}$$
 or 
$$\begin{array}{r} 435 \\ - 242 \\ \hline \end{array}$$

but 
$$\begin{array}{r} 435 \\ - 227 \\ \hline \end{array}$$
 and 
$$\begin{array}{r} 435 \\ - 318 \\ \hline \end{array}$$

Complete.



| hundreds | tens         | ones          |
|----------|--------------|---------------|
| 3        | <del>3</del> | <del>12</del> |
| - 1      | 2            | 5             |
| 2        | 1            | 7             |

| h   | t            | o             |
|-----|--------------|---------------|
| 3   | <del>3</del> | <del>12</del> |
| - 1 | 2            | 5             |
| 2   | 1            | 7             |



| h   | t            | o             |
|-----|--------------|---------------|
| 2   | <del>3</del> | <del>14</del> |
| - 1 | 0            | 6             |
| 1   | 2            | 8             |

| h   | t            | o             |
|-----|--------------|---------------|
| 2   | <del>3</del> | <del>14</del> |
| - 1 | 0            | 6             |
| 1   | 2            | 8             |

| h   | t            | o             |
|-----|--------------|---------------|
| 5   | <del>9</del> | <del>11</del> |
| - 3 | 2            | 8             |
| 2   | 6            | 3             |

| h   | t            | o             |
|-----|--------------|---------------|
| 6   | <del>7</del> | <del>13</del> |
| - 2 | 4            | 9             |
| 4   | 2            | 4             |

| h   | t            | o             |
|-----|--------------|---------------|
| 7   | <del>6</del> | <del>15</del> |
| - 3 | 4            | 8             |
| 4   | 1            | 7             |

| h   | t            | o             |
|-----|--------------|---------------|
| 5   | <del>7</del> | <del>18</del> |
| - 2 | 1            | 9             |
| 3   | 5            | 9             |

| h   | t            | o             |
|-----|--------------|---------------|
| 8   | <del>7</del> | <del>14</del> |
| - 2 | 3            | 7             |
| 5   | 2            | 6             |

| h   | t            | o             |
|-----|--------------|---------------|
| 9   | <del>8</del> | <del>14</del> |
| - 4 | 3            | 9             |
| 5   | 4            | 5             |

| h   | t            | o             |
|-----|--------------|---------------|
| 8   | <del>8</del> | <del>12</del> |
| - 1 | 6            | 7             |
| 7   | 1            | 5             |

| h   | t            | o             |
|-----|--------------|---------------|
| 5   | <del>9</del> | <del>16</del> |
| - 5 | 6            | 9             |
| 0   | 2            | 7             |

| h   | t            | o             |
|-----|--------------|---------------|
| 8   | <del>7</del> | <del>14</del> |
| - 8 | 5            | 7             |
| 0   | 1            | 7             |

| h   | t            | o             |
|-----|--------------|---------------|
| 8   | <del>9</del> | <del>10</del> |
| - 7 | 3            | 9             |
| 1   | 5            | 1             |

| h   | t            | o             |
|-----|--------------|---------------|
| 7   | <del>6</del> | <del>13</del> |
| - 6 | 5            | 5             |
| 1   | 0            | 8             |

| h   | t            | o             |
|-----|--------------|---------------|
| 7   | <del>8</del> | <del>12</del> |
| - 6 | 3            | 2             |
| 1   | 0            | 4             |

| h   | t            | o             |
|-----|--------------|---------------|
| 7   | <del>8</del> | <del>17</del> |
| - 3 | 2            | 9             |
| 4   | 5            | 8             |

| h   | t            | o             |
|-----|--------------|---------------|
| 9   | <del>9</del> | <del>15</del> |
| - 3 | 1            | 7             |
| 6   | 7            | 8             |

| h   | t            | o             |
|-----|--------------|---------------|
| 8   | <del>4</del> | <del>16</del> |
| - 7 | 3            | 8             |
| 1   | 0            | 8             |

| h   | t            | o             |
|-----|--------------|---------------|
| 7   | <del>8</del> | <del>12</del> |
| - 2 | 5            | 4             |
| 4   | 2            | 8             |

| h   | t            | o             |
|-----|--------------|---------------|
| 5   | <del>8</del> | <del>13</del> |
| - 2 | 4            | 6             |
| 3   | 3            | 7             |

| h   | t            | o             |
|-----|--------------|---------------|
| 6   | <del>9</del> | <del>14</del> |
| - 5 | 8            |               |
| 6   | 3            | 6             |

| h   | t            | o             |
|-----|--------------|---------------|
| 5   | <del>6</del> | <del>11</del> |
| - 4 | 1            | 4             |
| 1   | 4            | 7             |

| h   | t            | o             |
|-----|--------------|---------------|
| 7   | <del>9</del> | <del>15</del> |
| - 2 | 7            | 9             |
| 5   | 1            | 6             |

244 (two hundred forty-four)

Subtracting three-digit numbers, regrouping

## LESSON ACTIVITY

## Before Using the Page

• Write  $52 - 27$  in vertical form on the chalkboard. Have the children copy and complete it. Have a child use models of tens and ones to demonstrate the regrouping of one ten as ten ones. Have another child indicate on the chalkboard how this is shown when writing the solution.

Write  $352 - 127$  in vertical form on the chalkboard and ask how this exercise is different from the previous one. Have a child use models of hundreds, tens, and ones to represent 352. If necessary, draw vertical lines to separate the place values. Ask what must be done before they can subtract seven ones. Ask a child to use the models to show the regrouping of one ten as ten more ones. Have a child show on the chalkboard how the regrouping is indicated in the exercise. Ask the following sequence of questions: "Can we subtract seven ones now? How many ones are left? Are there any tens to be subtracted from four tens? How many tens are left? Are there any hundreds to be subtracted from three hundreds? How many hundreds are left?"

Write the numerals for the answers during the questioning procedure. Have a child read the three-place numeral formed and use the models to check this.

Repeat the procedure above for other exercises. Include the following types:

|   |   |   |  |
|---|---|---|--|
| $\begin{array}{r} 234 \\ - 234 \\ \hline \end{array}$ | $\begin{array}{r} 343 \\ - 138 \\ \hline \end{array}$ | $\begin{array}{r} 481 \\ - 418 \\ \hline \end{array}$ | $\begin{array}{r} 274 \\ - 39 \\ \hline \end{array}$ |
|---|---|---|--|

• Write more subtraction exercises on the chalkboard. Have the children copy and complete them. Children should help to explain the procedure that was used. Children who have difficulty should continue to draw vertical lines to separate the place-value columns.

## Using the Page

• Discuss the completed exercise at the top of the page, asking questions similar to those suggested in *Before Using the Page*. Have children explain why the models are ringed in the diagram. Discuss the second exercise and have the children complete it. Then let the children work independently as you help those who are having difficulty.

482 hunters last year  
246 hunters this year  
How many fewer hunters  
were there this year?

$$\begin{array}{r} \text{h} \quad \text{t} \quad \text{o} \\ 482 \\ -246 \\ \hline 236 \end{array}$$

Complete.

$$\begin{array}{r} 6 \quad 10 \\ 770 \\ -142 \\ \hline 628 \end{array}$$

$$\begin{array}{r} 8 \quad 11 \\ 691 \\ -129 \\ \hline 562 \end{array}$$

$$\begin{array}{r} 7 \quad 13 \\ 783 \\ -346 \\ \hline 437 \end{array}$$

$$\begin{array}{r} 7 \quad 15 \\ 585 \\ -267 \\ \hline 318 \end{array}$$

$$\begin{array}{r} 4 \quad 16 \\ 456 \\ -437 \\ \hline 19 \end{array}$$

$$\begin{array}{r} 8 \quad 16 \\ 696 \\ -478 \\ \hline 218 \end{array}$$

$$\begin{array}{r} 3 \quad 14 \\ 944 \\ -517 \\ \hline 427 \end{array}$$

$$\begin{array}{r} 4 \quad 17 \\ 557 \\ -139 \\ \hline 418 \end{array}$$

$$\begin{array}{r} 5 \quad 18 \\ 968 \\ -419 \\ \hline 549 \end{array}$$

$$\begin{array}{r} 7 \quad 14 \\ 884 \\ -35 \\ \hline 849 \end{array}$$

$$\begin{array}{r} 3 \quad 13 \\ 943 \\ -235 \\ \hline 708 \end{array}$$

$$\begin{array}{r} 7 \quad 15 \\ 585 \\ -346 \\ \hline 239 \end{array}$$

$$\begin{array}{r} 4 \quad 13 \\ 753 \\ -204 \\ \hline 549 \end{array}$$

$$\begin{array}{r} 5 \quad 15 \\ 965 \\ -328 \\ \hline 637 \end{array}$$

$$\begin{array}{r} 5 \quad 12 \\ 862 \\ -234 \\ \hline 628 \end{array}$$

$$\begin{array}{r} 4 \quad 10 \\ 750 \\ -546 \\ \hline 204 \end{array}$$

$$\begin{array}{r} 2 \quad 15 \\ 833 \\ -309 \\ \hline 526 \end{array}$$

$$\begin{array}{r} 6 \quad 17 \\ 877 \\ -528 \\ \hline 349 \end{array}$$

$$\begin{array}{r} 3 \quad 16 \\ 646 \\ -529 \\ \hline 117 \end{array}$$

$$\begin{array}{r} 3 \quad 14 \\ 944 \\ -638 \\ \hline 306 \end{array}$$

$$\begin{array}{r} 8 \quad 11 \\ 791 \\ -733 \\ \hline 58 \end{array}$$

$$\begin{array}{r} 2 \quad 14 \\ 834 \\ -128 \\ \hline 706 \end{array}$$

$$\begin{array}{r} 2 \quad 12 \\ 932 \\ -115 \\ \hline 817 \end{array}$$

$$\begin{array}{r} 8 \quad 13 \\ 293 \\ -158 \\ \hline 135 \end{array}$$

$$\begin{array}{r} 7 \quad 15 \\ 988 \\ -37 \\ \hline 948 \end{array}$$

$$\begin{array}{r} 8 \quad 11 \\ 791 \\ -684 \\ \hline 107 \end{array}$$

Subtracting three-digit numbers: regrouping

(two hundred forty-five) 245

## LESSON OUTCOME

Subtract three-digit numbers, regrouping of tens as ones, minuends to 999

## Materials

models for hundreds, tens, and ones, place-value pocket chart, three-place abacus

## RELATED ACTIVITIES

- Prepare puzzles, similar to the one shown, for the children to assemble.

|              |              |              |              |
|--------------|--------------|--------------|--------------|
| 852<br>- 435 | 455<br>- 228 | 460<br>- 325 | 691<br>- 232 |
| 417          | 227          | 135          | 459          |
| 784          | 713          | 586          | 978          |
| - 236        | - 607        | - 228        | - 239        |
| 548          | 106          | 358          | 739          |

Because all the pieces in the middle row are of the same size and shape, the children must either add or subtract to find the piece that fits. For example, for the first piece in the middle row, they can subtract to find the answer for the first exercise in the first row and then look for the piece that has 417 at the top. Or, for the first exercise in the third row, they can add the answer and the number subtracted and then look for the piece that has 784 at the bottom.

## LESSON ACTIVITY

### Before Using the Page

- Review the procedure of subtracting three-digit numbers using models of hundreds, tens, and ones, the place-value pocket chart, and the abacus. Have children suggest how to represent the numbers using these devices and how to show the regrouping necessary. Have children help to show the regrouping of one ten as ten ones and show the removal of blocks, sticks, and beads for subtraction. Have other children help to write the results on the chalkboard.

### Using the Page

- Read the problem to the children and discuss the completed exercise. Then let the children work independently.
- After the children have completed the exercises, have them use addition to check each subtraction exercise on the page, for example,

$$\begin{array}{r} 6 \quad 10 \\ 770 \\ -142 \\ \hline 628 \end{array}$$

$$\begin{array}{r} 1 \\ 628 \\ +142 \\ \hline 770 \end{array}$$



**OBJECTIVE**

Demonstrate an understanding of concepts presented in this unit

**Materials**

work sheets for addition and subtraction exercises, materials to prepare the game "Parking Lot", cards showing sets of coins having values to 99 cents, real money, play money, or coin cutouts from copies of page T327

**RELATED ACTIVITIES**

- Prepare cards showing sets of coins having values to 99 cents. Have each child select a card and use that amount as spending money at the play store.
- Check the children's work carefully to determine what reteaching is necessary and assign practice exercises as required.

Add.

$$\begin{array}{r} 245 \\ + 143 \\ \hline 388 \end{array}$$

$$\begin{array}{r} 273 \\ + 623 \\ \hline 896 \end{array}$$

$$\begin{array}{r} 603 \\ + 354 \\ \hline 957 \end{array}$$

$$\begin{array}{r} 317 \\ + 621 \\ \hline 938 \end{array}$$

$$\begin{array}{r} 674 \\ + 205 \\ \hline 879 \end{array}$$

Subtract.

$$\begin{array}{r} 798 \\ - 235 \\ \hline 563 \end{array}$$

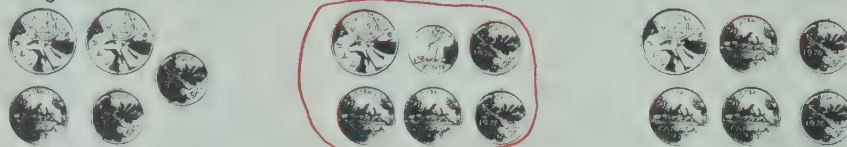
$$\begin{array}{r} 579 \\ - 349 \\ \hline 230 \end{array}$$

$$\begin{array}{r} 668 \\ - 304 \\ \hline 364 \end{array}$$

$$\begin{array}{r} 759 \\ - 524 \\ \hline 235 \end{array}$$

$$\begin{array}{r} 408 \\ - 302 \\ \hline 106 \end{array}$$

Ring the set of coins with the value 47¢.

You have  and 

You spend 27¢.

You have 8¢ left.You have  and 

You spend 46¢.

You have 4¢ left.

Add.

$$\begin{array}{r} 237 \\ + 453 \\ \hline 690 \end{array}$$

$$\begin{array}{r} 508 \\ + 484 \\ \hline 992 \end{array}$$

$$\begin{array}{r} 245 \\ + 336 \\ \hline 581 \end{array}$$

$$\begin{array}{r} 469 \\ + 217 \\ \hline 686 \end{array}$$

$$\begin{array}{r} 588 \\ + 205 \\ \hline 793 \end{array}$$

Subtract.

$$\begin{array}{r} 717 \\ 787 \\ - 368 \\ \hline 419 \end{array}$$

$$\begin{array}{r} 812 \\ 692 \\ - 456 \\ \hline 236 \end{array}$$

$$\begin{array}{r} 515 \\ 965 \\ - 257 \\ \hline 708 \end{array}$$

$$\begin{array}{r} 511 \\ 861 \\ - 329 \\ \hline 532 \end{array}$$

$$\begin{array}{r} 214 \\ 634 \\ - 106 \\ \hline 528 \end{array}$$

246 (two hundred forty-six)

CHECKUP

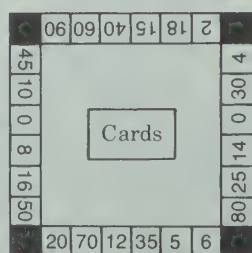
**LESSON ACTIVITY****Before Using the Page**

- Review addition, subtraction, and multiplication by using the following activities.

1. For reviewing addition and subtraction, prepare tables similar to those shown for the second activity in *Related Activities* on page T309. Have the children complete these and then use addition to check each subtraction.
2. Have children review multiplication facts by playing the game "Parking Lot" in groups of four.

**Materials**

markers to be used as "cars"  
a set of 30 cards showing multiplication facts (10 cards each) of 2, 5, and 10 (a card showing  $6 \times 2$ , for example, indicates that a "car" is to be "parked" on 12)



a game board, similar to the one shown, with parking spaces large enough for the "cars" to park

**Rules**

1. Each player chooses a parking lot and six "cars".
2. The first player turns over a card.
3. If the answer appears in her/his parking lot, a "car" may be parked in the space.
4. If the answer does not appear in her/his parking lot, the player cannot play and places the card at the bottom of the pile.
5. The second player turns over a card and the game continues.
6. The player whose parking lot is filled first is the winner.

**Using the Page**

- Discuss with the children how they are to proceed on the page. Observe them as they work and note those who are having difficulty.

## OBJECTIVE

Demonstrate an understanding of concepts presented in this book

Complete.

|     |     |     |            |            |            |            |            |
|-----|-----|-----|------------|------------|------------|------------|------------|
| 26  | 27  | 28  | <u>29</u>  | <u>30</u>  | <u>31</u>  | <u>32</u>  | <u>33</u>  |
| 135 | 136 | 137 | <u>138</u> | <u>139</u> | <u>140</u> | <u>141</u> | <u>142</u> |
| 6   | 8   | 10  | <u>12</u>  | <u>14</u>  | <u>16</u>  | <u>18</u>  | <u>20</u>  |
| 25  | 30  | 35  | <u>40</u>  | <u>45</u>  | <u>50</u>  | <u>55</u>  | <u>60</u>  |
| 40  | 50  | 60  | <u>70</u>  | <u>80</u>  | <u>90</u>  | <u>100</u> | <u>110</u> |
| 4   | 14  | 24  | <u>34</u>  | <u>44</u>  | <u>54</u>  | <u>64</u>  | <u>74</u>  |

What number comes before?

9 10      46 47      99 100

What number comes after?

19 20      70 71      122 123

What number comes between?

51 52 53      109 110 111      299 300 301

Write < or >.

9 (<) 20      56 (>) 48      197 (>) 179

Complete.

|                                      |                                  |
|--------------------------------------|----------------------------------|
| 4 tens 6 ones = <u>46</u>            | 17 = <u>1</u> ten <u>7</u> ones  |
| 8 tens 0 ones = <u>80</u>            | 93 = <u>9</u> tens <u>3</u> ones |
| 1 hundred 2 tens 3 ones = <u>123</u> | 204 = <u>2</u> hundreds          |
|                                      | <u>0</u> tens <u>4</u> ones      |

YEAR-END CHECKUP

(two hundred forty-seven) 247

### Comments

• The exercises on this page and the following three pages are designed to test the children's performance on the material presented in this book. The test may be given over two to four days.

The following objectives are tested on this page and in the order indicated:

1. Count and order numbers to 999
2. Count by twos, fives, and tens
3. Identify numbers before, after, and between whole numbers to 999
4. Recognize and use the symbols > and < ; identify which of two numbers is greater than (less than) the other
5. Write standard numerals for numbers to 999; interpret place value in numerals to 999



**OBJECTIVE**

Demonstrate an understanding of concepts presented in this book

Complete.

$$\begin{array}{r} 0 \\ + 7 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ + 2 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 9 \\ + 4 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 5¢ \\ + 8¢ \\ \hline 13¢ \end{array}$$

$$\begin{array}{r} 9 \\ - 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 11 \\ - 9 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 15 \\ - 6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 16¢ \\ - 9¢ \\ \hline 7¢ \end{array}$$

Write the related facts.

$7 + 5 = 12$

$5 + 7 = 12$

$12 - 5 = 7$

$12 - 7 = 5$

Complete.

$$\begin{array}{r} 102 \\ + 134 \\ \hline 236 \\ 287 \\ - 113 \\ \hline 174 \end{array}$$

$$\begin{array}{r} 133 \\ + 225 \\ \hline 358 \\ 695 \\ - 263 \\ \hline 432 \end{array}$$

$$\begin{array}{r} 256 \\ + 304 \\ \hline 560 \\ 480 \\ - 243 \\ \hline 247 \end{array}$$

$$\begin{array}{r} 235 \\ + 136 \\ \hline 371 \\ 472 \\ - 356 \\ \hline 116 \end{array}$$

Subtract. Then add to check.

$$\begin{array}{r} 95 \\ - 65 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 30 \\ + 65 \\ \hline 95 \end{array}$$

$$\begin{array}{r} 4\ 16 \\ 56 \\ - 28 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 1 \\ 28 \\ + 28 \\ \hline 56 \end{array}$$

Complete.

$2 + 8 = 10$

$8 + 6 = 14$

$9 + 8 = 17$

$4 + 7 + 5 = 16$

$8 + 1 + 6 = 15$

$3 + 2 + 9 = 14$

$$\begin{array}{r} 30 \\ + 40 \\ \hline 70 \\ 80 \\ - 40 \\ \hline 40 \end{array}$$

$$\begin{array}{r} 41 \\ + 56 \\ \hline 97 \\ 87 \\ - 34 \\ \hline 53 \end{array}$$

$$\begin{array}{r} 65 \\ + 8 \\ \hline 73 \\ 80 \\ - 7 \\ \hline 29 \end{array}$$

$$\begin{array}{r} 33 \\ + 57 \\ \hline 90 \\ 80 \\ - 27 \\ \hline 23 \end{array}$$

$$\begin{array}{r} 44 \\ + 38 \\ \hline 82 \\ 85 \\ - 28 \\ \hline 57 \end{array}$$

$$\begin{array}{r} 48¢ \\ + 48¢ \\ \hline 96¢ \\ 81¢ \\ - 39¢ \\ \hline 22¢ \end{array}$$

248 (two hundred forty-eight)

YEAR-END CHECKUP

**Comments**

- This is the second of the four pages for the *Year-End Checkup*. (See page T317.)

The following objectives are tested on this page and in the order indicated:

1. Complete basic addition facts, sums to 18
2. Complete basic subtraction facts, minuends to 18
3. Write related addition and subtraction facts, sums to 18
4. Determine the missing addend in a basic addition fact, sums to 18
5. Add three one-digit numbers, sums to 18
6. Add two-digit numbers, no regrouping and regrouping, sums to 99
7. Subtract two-digit numbers, no regrouping and regrouping, minuends to 99
8. Use addition to check subtraction
9. Add three-digit numbers, no regrouping and regrouping ones as tens, sums to 999
10. Subtract three-digit numbers, no regrouping and regrouping tens as ones, minuends to 999

## OBJECTIVE

Demonstrate an understanding of concepts presented in this book

Complete.

26 apples are in a box.

38 apples are in a basket.

How many apples are there in all?

64 apples

$$\begin{array}{r} 26 \\ + 38 \\ \hline 64 \end{array}$$

27 birds are in the trees.

42 birds are on the grass.

How many more birds are on the grass?

15 birds

$$\begin{array}{r} 42 \\ - 27 \\ \hline 15 \end{array}$$

I have 55¢.

I get 29¢.

I have 84 ¢ in all.

I have 83¢.

I spend 26¢.

I have 57 ¢ left.

$$\begin{array}{r} 55 \\ + 29 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 83 \\ - 26 \\ \hline 57 \end{array}$$

$5 \times 2 = \underline{10}$

$6 \times 5 = \underline{30}$

$5 \times 5 = \underline{25}$

$7 \times 10 = \underline{70}$

$8 \times 2 = \underline{16}$

$4 \times 5 = \underline{20}$

How much?



37 ¢



41 ¢



21 °C

Measure.

11 cm

Estimate the length of this page in centimetres. Then measure.

Answers will vary.

Estimate      cm

Measurement 28 cm

YEAR-END CHECKUP

(two hundred forty-nine) 249

## Comments

- This is the third of the four pages for the *Year-End Checkup*. (See page T317.)

The following objectives are tested on this page and in the order indicated:

1. Solve problems involving addition or subtraction, regrouping, sums and minuends to 99
2. Complete sentences for multiplication facts of 2, 5, and 10
3. Determine the values of sets of coins, to 50 cents
4. Read temperatures on a Celsius scale
5. Measure length to the nearest centimetre; estimate length in centimetres; measure to check an estimate of length



# OBJECTIVE

Demonstrate an understanding of concepts presented in this book

Write the time shown



5:15



7:45



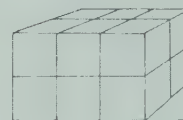
10:25

Count the  $\square$ 's.



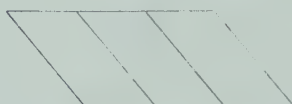
12

Count the  $\square$ 's.



12

Which fraction tells how much is gray?

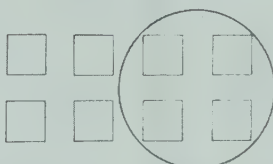


$\frac{1}{3}$   $\frac{2}{3}$   $\frac{2}{4}$

Color  $\frac{3}{4}$  of this shape.

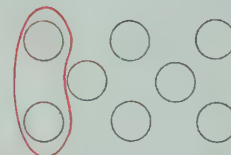


Which fraction tells how many are ringed?

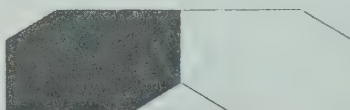


$\frac{1}{2}$   $\frac{3}{4}$   $\frac{4}{10}$

Ring one fourth.



How can you make the red shape fit the blue shape?



Slide Turn **Flip**



**Slide** Turn Flip



Slide **Turn** Flip

250 (two hundred fifty)

YEAR-END CHECKUP

## Comments

- This is the last of the four pages for the *Year-End Checkup*. (See page T317.)

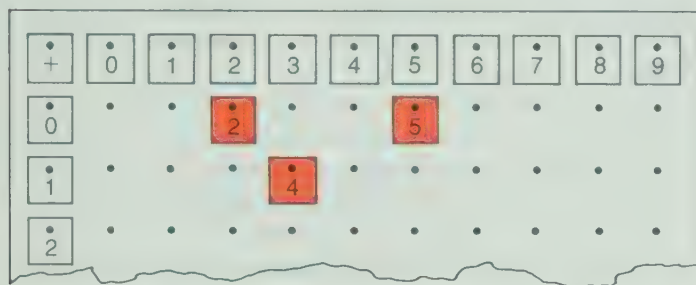
The following objectives are tested on this page and in the order indicated:

- Read and record time in quarter hours and at five-minute marks
- Count the square units contained by a shape
- Count the units of volume in a shape
- Recognize/Identify part of a whole (halves, thirds, fourths, tenths)
- Recognize/Identify part of a set (halves, thirds, fourths, tenths)
- Identify slides, turns, and flips

## Extra Materials

Pages T322 to T348 include materials that have been referred to in the teaching suggestions for various lessons. Although suggestions for using many of these materials are given in the related lesson outlines, other suggestions for some of the materials are given below.

The number board described on page T322 may be used in conjunction with the charts on pages T333 and T335. Children can ring the numbers in a row, column, or diagonal and observe the pattern. When adapted to show an addition table, the number board may be used in conjunction with the table on page T334. Tags of one color are used for addends and a different color, for sums. Children can hang the tags for sums on the appropriate hooks and observe patterns. The completed table may be displayed for several days. From time to time, a few tags may be removed to encourage the children to memorize the facts.



Certain materials for tens and ones are suitable for display on the number board. For example, record centres or metal-rimmed tags, whether single or bundled into tens and tied with pipe cleaners or string, are easily displayed.

The shapes on pages T323 and T324 may be used for making attribute blocks (see page xxxi) since the actual size is shown. These shapes also lend themselves for work with fractions since their dimensions are such that four of one small shape exactly cover the corresponding large shape (with the exception of the circles). The large circle is of a suitable size for making individual number spinners.

The patterns for the three-dimensional shapes on pages T325 and T326 are marked with recommended dimensions. You may find it easier to construct these shapes if each pattern is outlined first on squared paper (page T342), using the centimetre grid lines as a guide.

Copies of the coins on page T327 and the one-dollar bills on page T328 are useful for preparing cards and game boards as described in *Related Activities* on pages T107 and T299.

The chart on page T329 may be used not only for showing the current month, but also for making weather charts for various months, birthday months of individual children, and records of different activities.

Note that copies of page T331 may be cut, if desired, to provide number lines with points identified (0 to 10 and 0 to 25) or unidentified.

The tables on page T332 may be used either horizontally or vertically in practising number facts.

Copies of page T336 will be suitable for preparing models of hundreds, tens, and ones for the children. These may be prepared by pasting the cutouts on cardboard, laminating the surface (optional), and then cutting the models apart as desired.

Clock faces marked in hours are given on page T337, and others marked in hours and minutes are given on page T338.

Copies of these pages may be cut into strips of either three or four clock faces, depending upon the number of exercises you wish the children to complete.

Two patterns for geopaper are provided. The dots of the patterns on pages T341 and T342 are 2 cm and 1 cm apart, respectively. Copies of these pages may be used by children to create patterns. The children may exchange sheets and attempt to continue patterns started by someone else. After children are introduced to the concept of a line segment (page 168), they may practise drawing line segments by using a straight edge to join pairs of dots.



The 25-point pattern on page T345 may be used for preparing geoboards and geopaper to match the geoboards on pages 191 and 213.

Copies of page T343 will be suitable for preparing individual game boards or work sheets for activities such as those suggested on pages T57, T163, T247, T261, T307. A class set of domino cards may be prepared by pasting the squared paper on thick cardboard, marking the appropriate dots, laminating the surface (optional), and then cutting the domino pieces apart. Copies of this page will also be suitable for graphing where the children are to color squares for a bar graph. Copies of this page may be cut into strips for the numbers 1 to 10. The strips may be colored so that all the strips for a particular number are the same color. Children can manipulate the strips to illustrate number facts. For example, they can show that the 3 strip and the 5 strip have the same length as the 8 strip, and then write the addition sentence.

Since these strips and the number lines on page T331 are both scaled in centimetres, they may be used together to illustrate the number facts. For example, have the children place or glue two strips above a number line to indicate a sum of 7, and then write the addition sentence.

If the strips are marked with the numerals, subtraction can be illustrated by bending back the number of units being taken away, or by covering the end of the minuend strip with an inverted strip for the subtrahend.



Since children find it easier to work with actual shapes when testing for slides, turns, and flips, the shapes on pages 188, 189, 212, and 232 are reproduced on page T346, if you wish to use them.

If you wish to demonstrate tangram pictures using an overhead projector, copy the tangrams on page T347 onto a thick sheet of colored acetate, cut the pieces apart, and then reassemble them on the overhead projector to show tangram pictures. For the children's use, the pattern can be pasted onto a sheet of colored Bristol board, laminated, and then cut apart.

The children may use their tangram pieces to make shapes such as those shown on page T348.



## Games and Activities

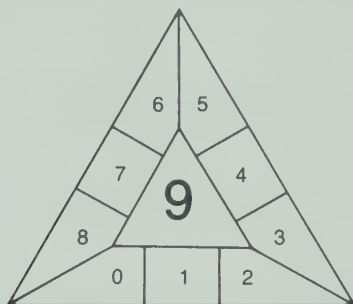
### Lucky Nine (Game for page 24)

#### Materials

a game board as shown below

ten markers for each player

domino cards such that the sum of the two numbers represented on each card is less than 10 (addition fact cards may also be used)



#### Rules

1. The domino cards are turned face down.
2. The first of two or three players turns a domino card face up and states the corresponding addition sentence, for example,

$$6 + 2 = 8 \text{ for}$$

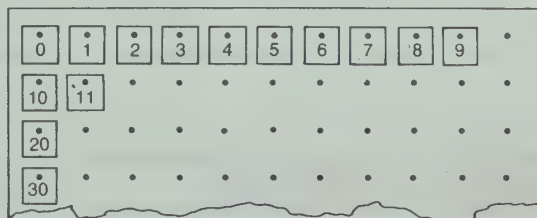


and places a marker on the space for 8 on the game board. If there is a marker on the space for 8 already, the player removes it and places it in her/his pile of markers, instead of placing a marker there.

3. A player who obtains a domino card for 9 claims all the markers on the game board.
4. The game ends when one player has no more markers.
5. The winner is the player with the most markers.

### Number Board (for page 68)

A board large enough for 121 nails or hooks for hanging tags on is useful for many activities.



Obtain a piece of plywood that is 60 cm by 60 cm and about 1 cm thick. Place 121 nails (or hooks) at 5 cm intervals in a square array, forming eleven rows with eleven nails in each row. Copies of page T342 may be taped to the board as a guide in placing the nails.

Prepare tags, either circular or square to fit the space available. Punch each tag with a hole for hanging from the nails. Print a numeral on one side of each tag and leave the other side of the tag blank.

This number board may be used to teach counting and recognition of the order of numbers. For example, the tags may be turned with the blank side out and the children may be asked to point to the tag with a certain numeral on it. Then they can check

to see whether they are correct by looking at the numeral on the other side of the tag.

Children may practise ordering numbers by taking the tags at random and placing them on the board in their correct positions.

Skip counting may be demonstrated on the board as follows: the numbers that are skipped may have their tags turned with the blank side out and thus only the numbers being counted will show. These numbers may be even numbers or odd numbers, or the numbers starting at zero and counting by fives or tens.

### Bingo Facts (Game for page 128)

#### Materials

a game board as shown

bingo chips or markers of a different

color for each player

one die marked 1, 2, 3, 4, 5, 6

one die marked 3, 4, 5, 6, 7, 8

one die marked 5, 6, 7, 8, 9, 10

|    |    |    |    |    |
|----|----|----|----|----|
| 0  | 1  | 2  | 3  | 4  |
| 5  | 6  | 7  | 8  | 9  |
| 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 1  | 18 |    |

#### Rules

1. Two to four players take turns rolling the three dice.
2. Each player may choose two of the three numbers rolled and add or subtract them to obtain a number shown on the game board. A marker is placed in the square for that number.
3. If a square is already covered, no other player may use it.
4. If a player is unable to place a marker on any square, the next player has a turn.
5. When all the squares are covered, the player with the most markers on the game board is the winner.

### High and Low (Game for page 243)

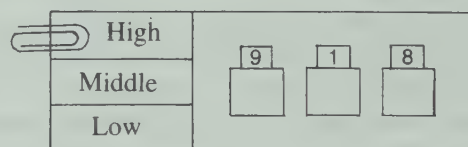
#### Materials

one set of numeral cards for 0 to 9

three pocket charts similar to the one shown, prepared from

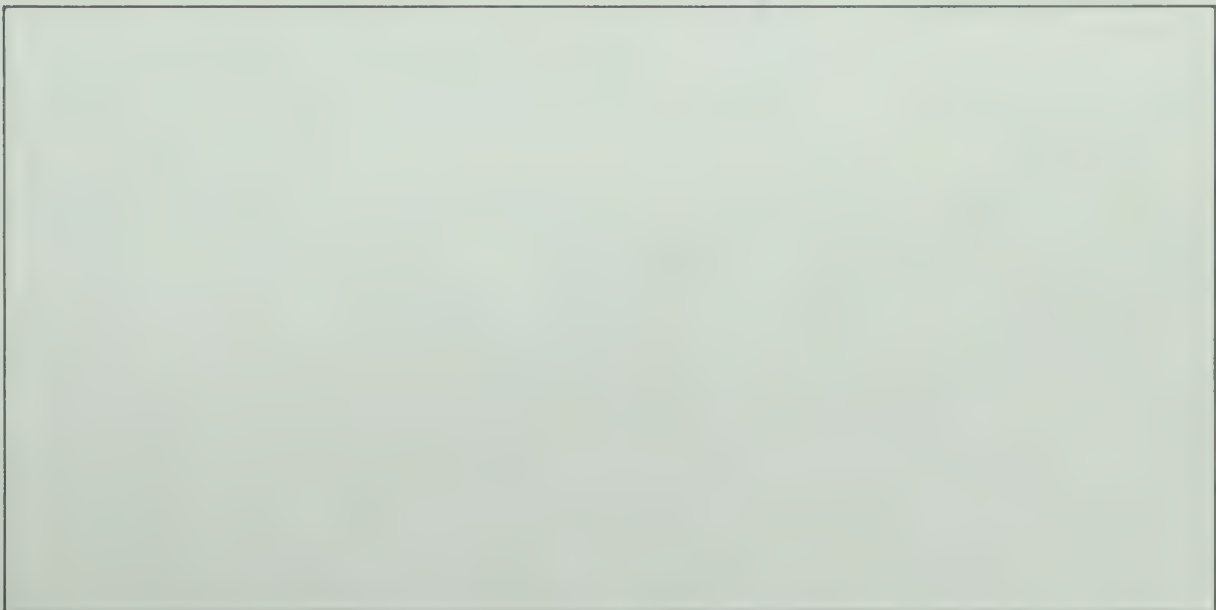
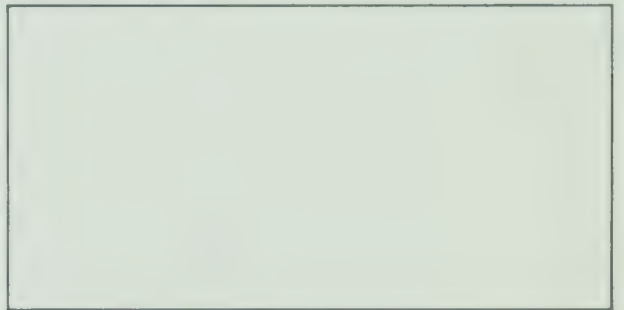
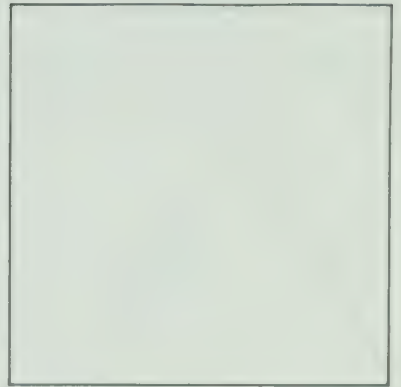
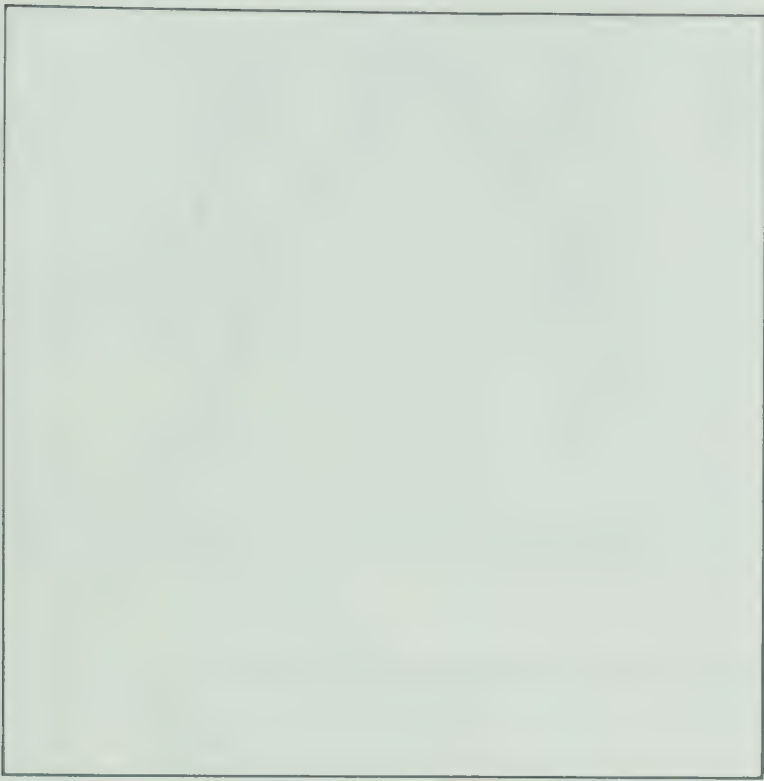
Bristol board and library-book pockets

three paper clips

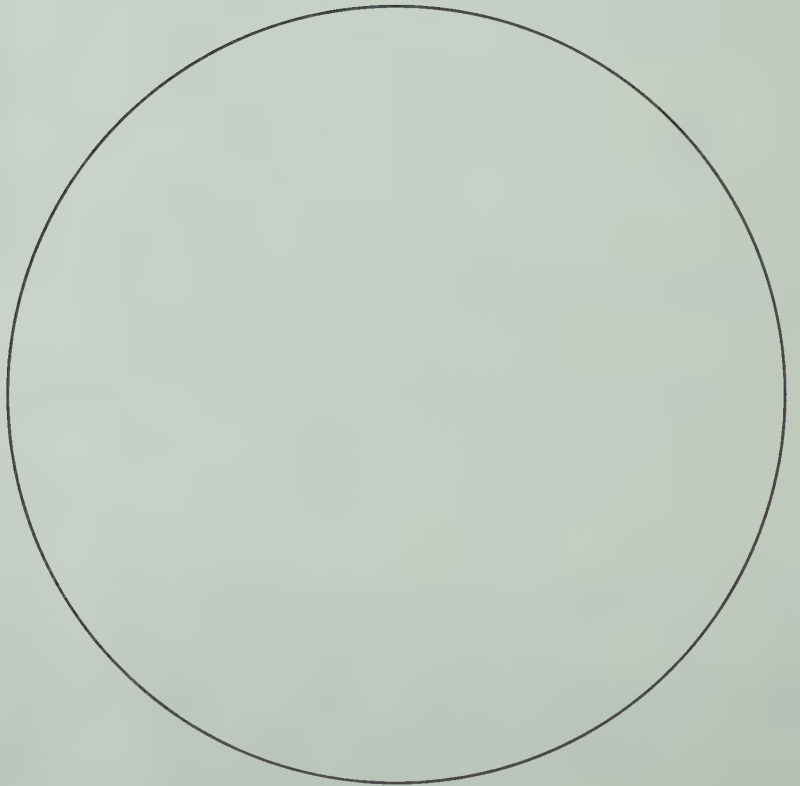
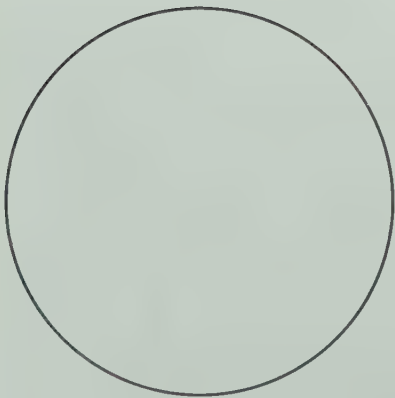
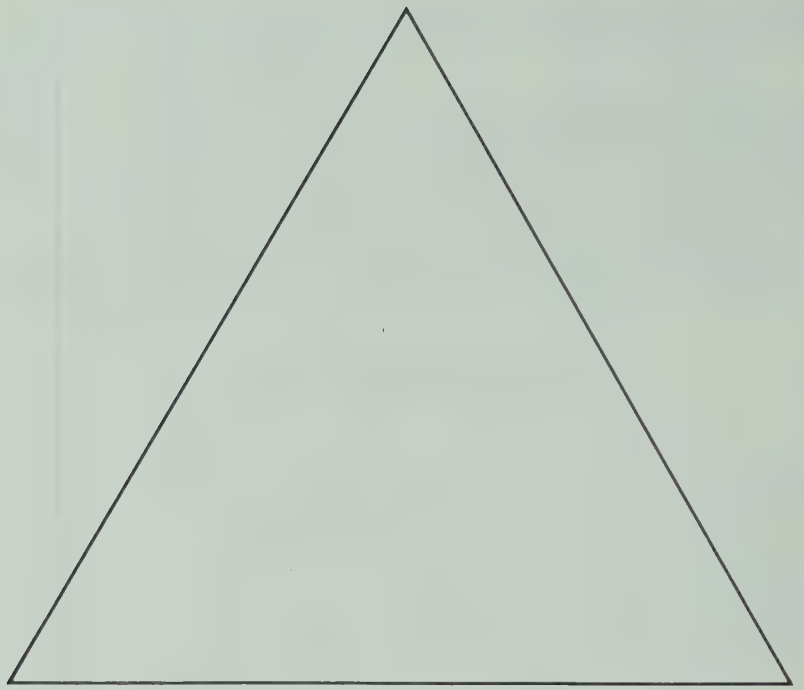


#### Rules

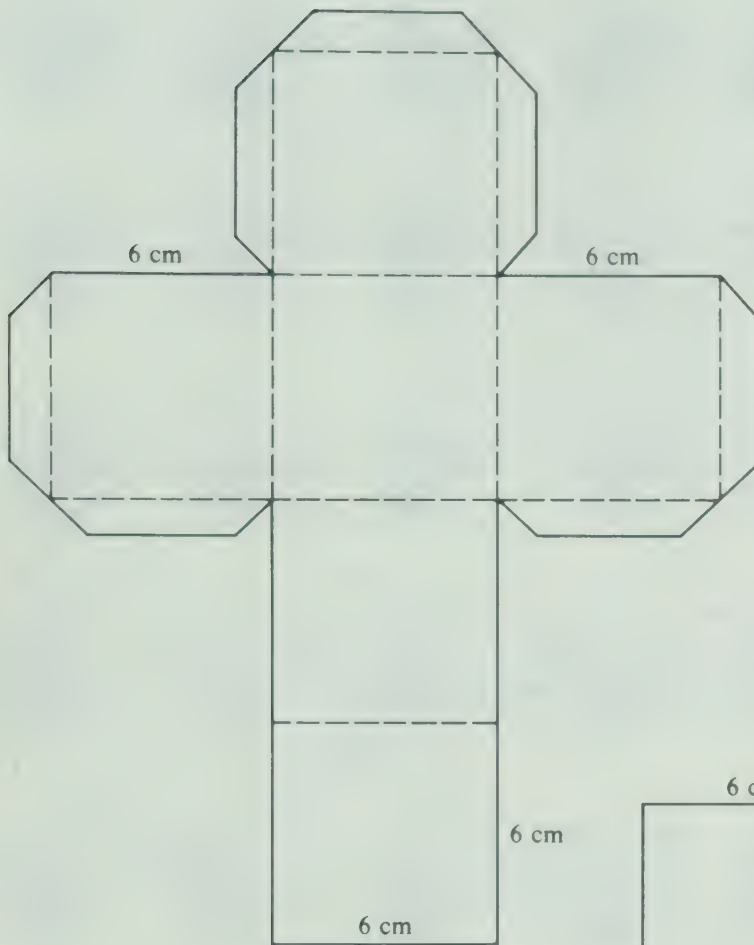
1. The cards are shuffled and dealt so that each player receives three cards. The tenth card is not exposed.
2. The players arrange their cards in the pocket charts to show a three-place numeral. They must decide whether the numerals on their cards are best suited for forming a three-digit number that is "high", "middle", or "low". Each player uses a paper clip to indicate whether her/his number is "high", "middle", or "low".
3. After all the players have chosen their positions, the pocket charts are displayed and the numbers are compared. A point is awarded to each player whose number appears according to the position chosen. For example, John chose "high" and placed the cards in the order 7, 6, 3, but his number was not the "highest". Susan also chose "high" and placed the cards in the order 9, 1, 8. So, Susan scored a point, but John did not. Peter who chose "low" also scored a point for placing the cards in the order 2, 0, 4.



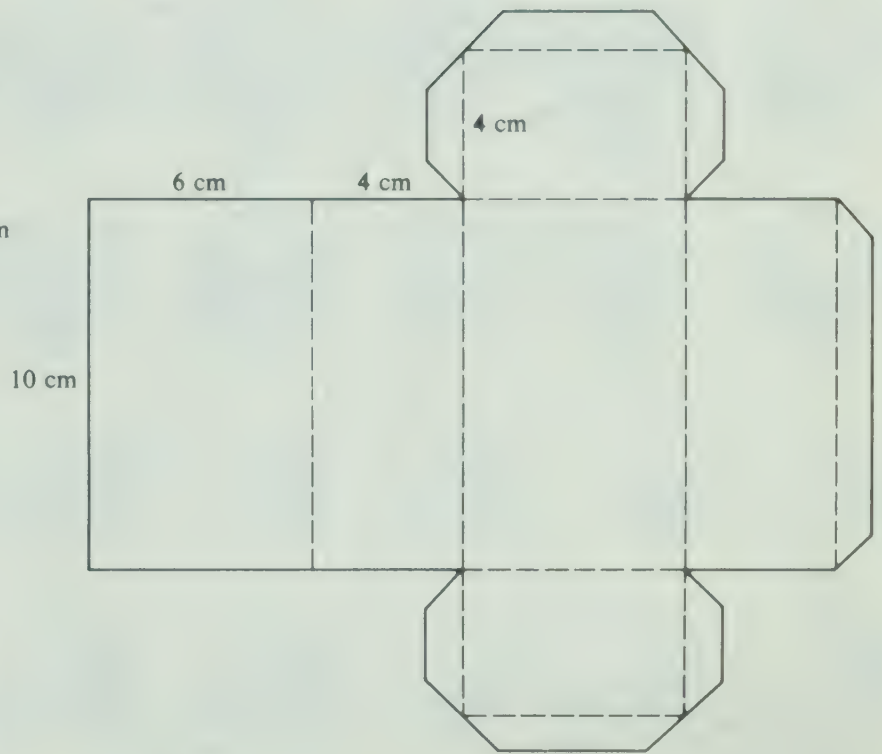




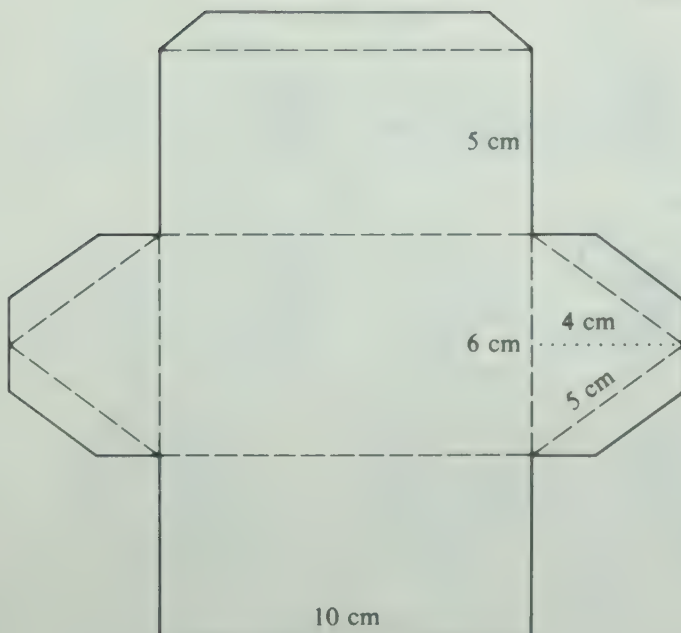
Cube



Rectangular Prism

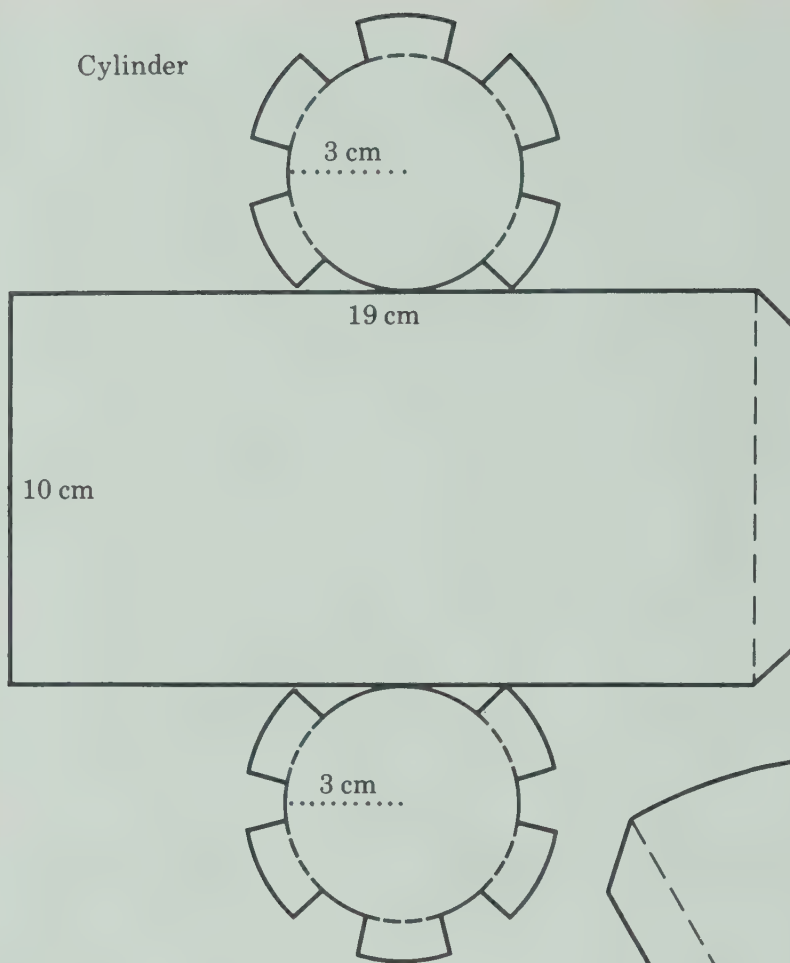


Triangular Prism

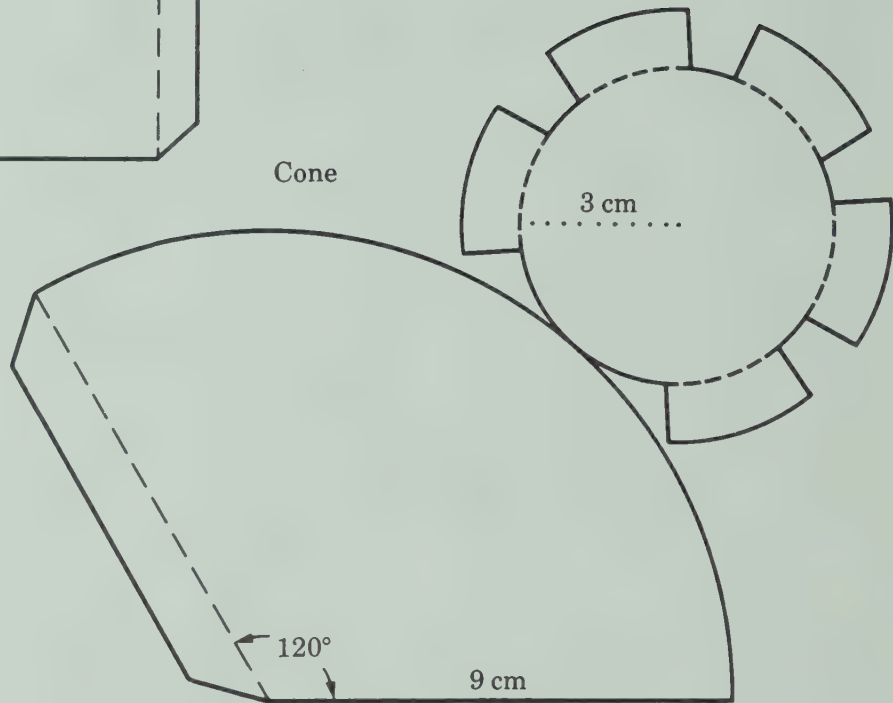




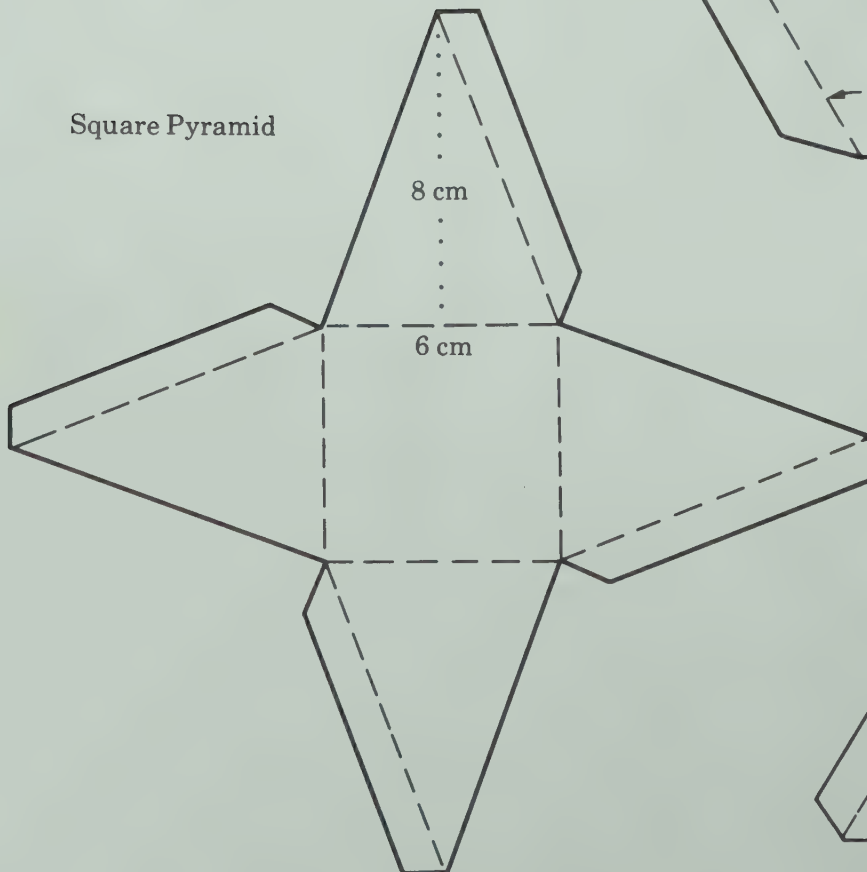
Cylinder



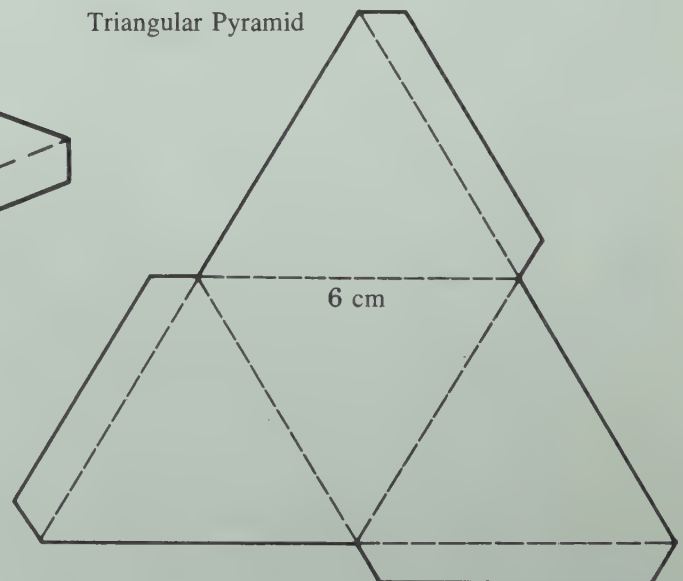
Cone



Square Pyramid



Triangular Pyramid





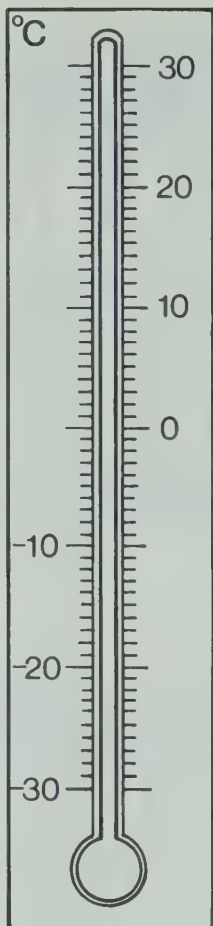


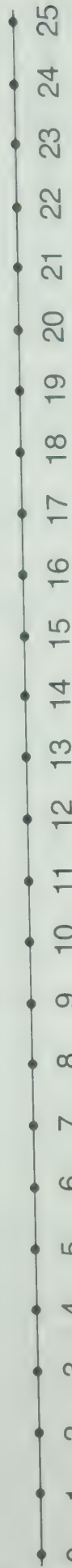


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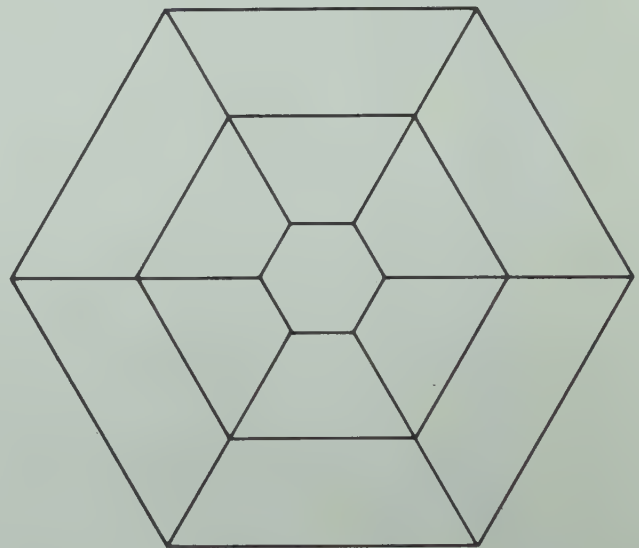
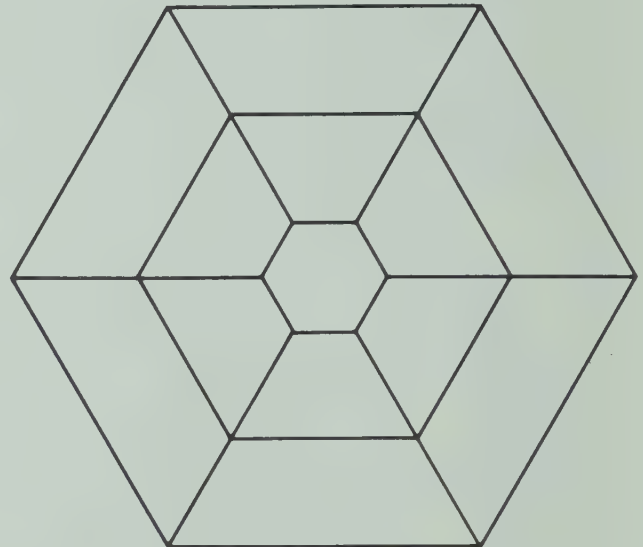
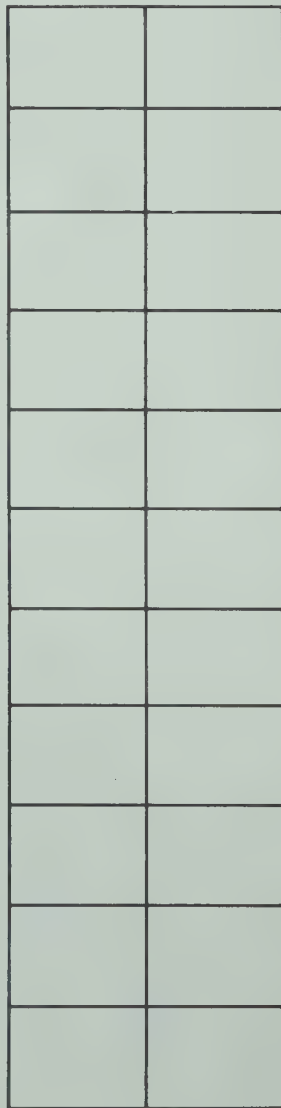
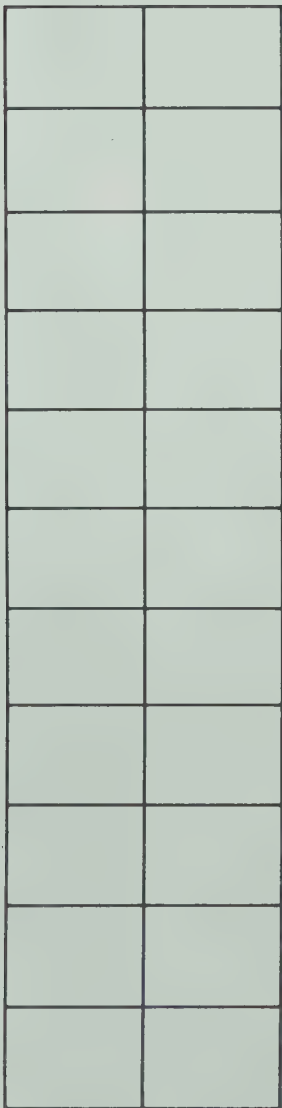
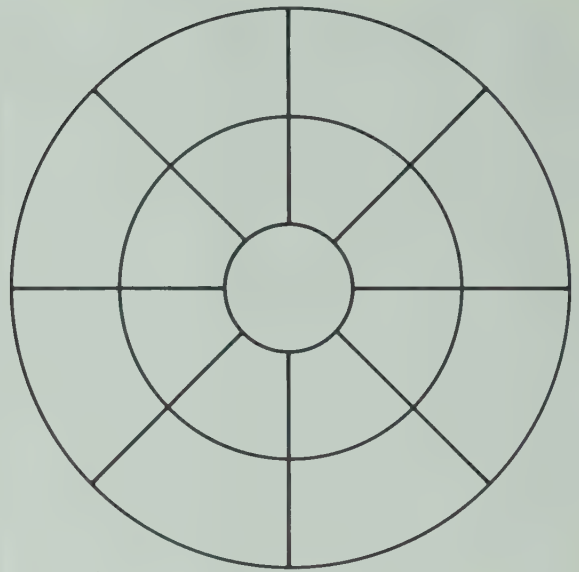
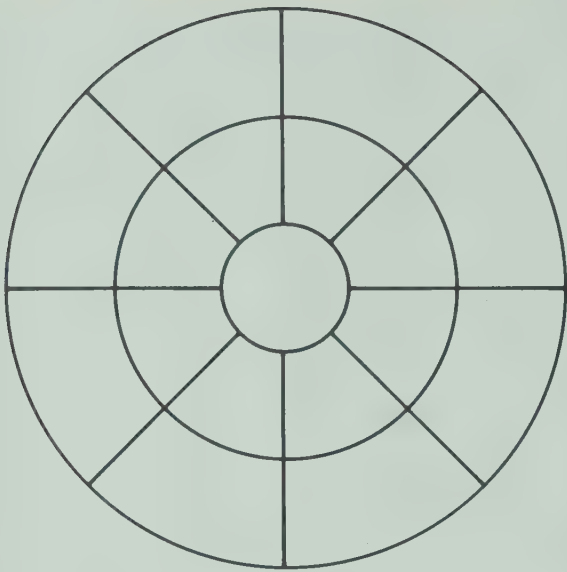
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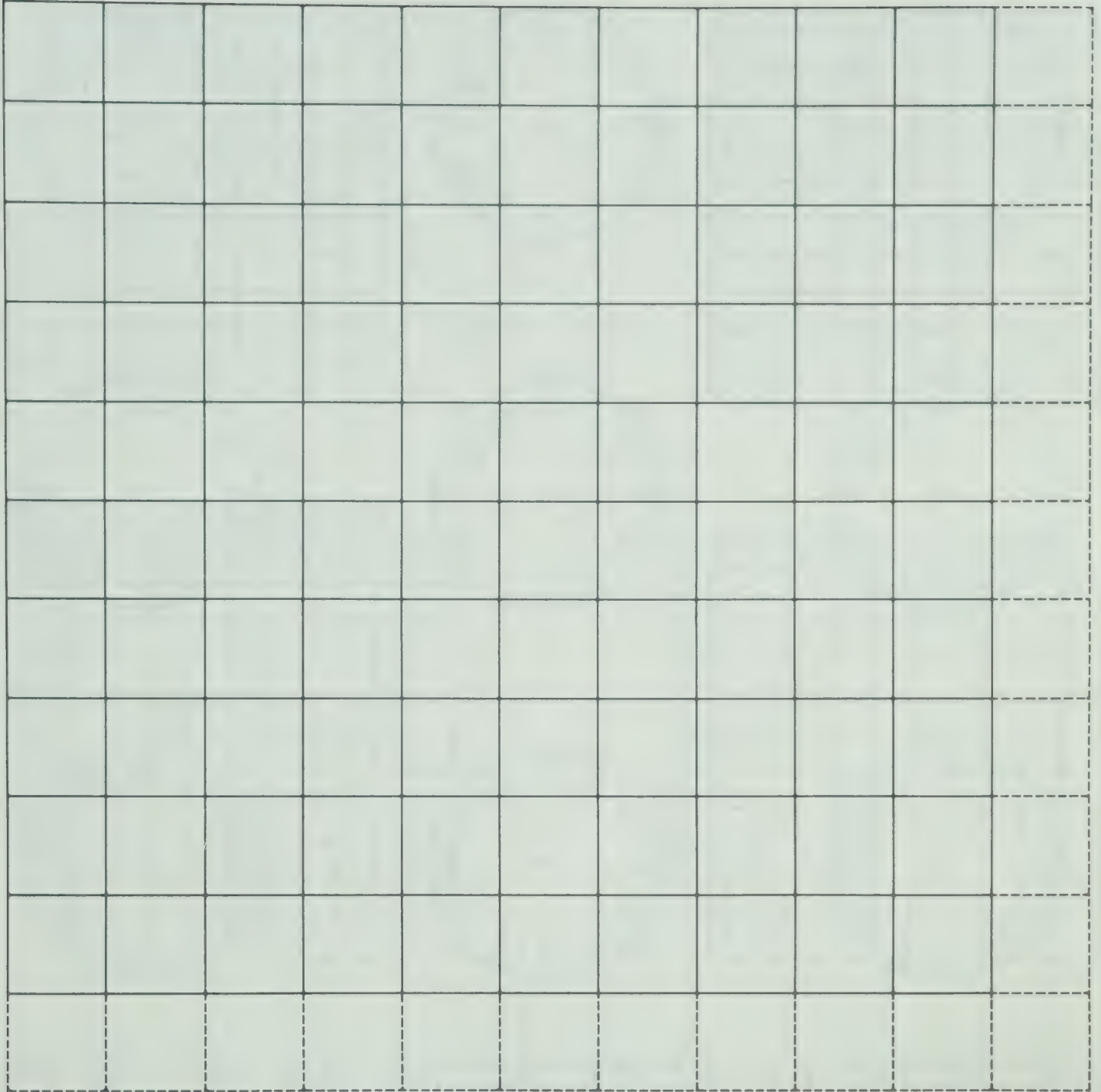




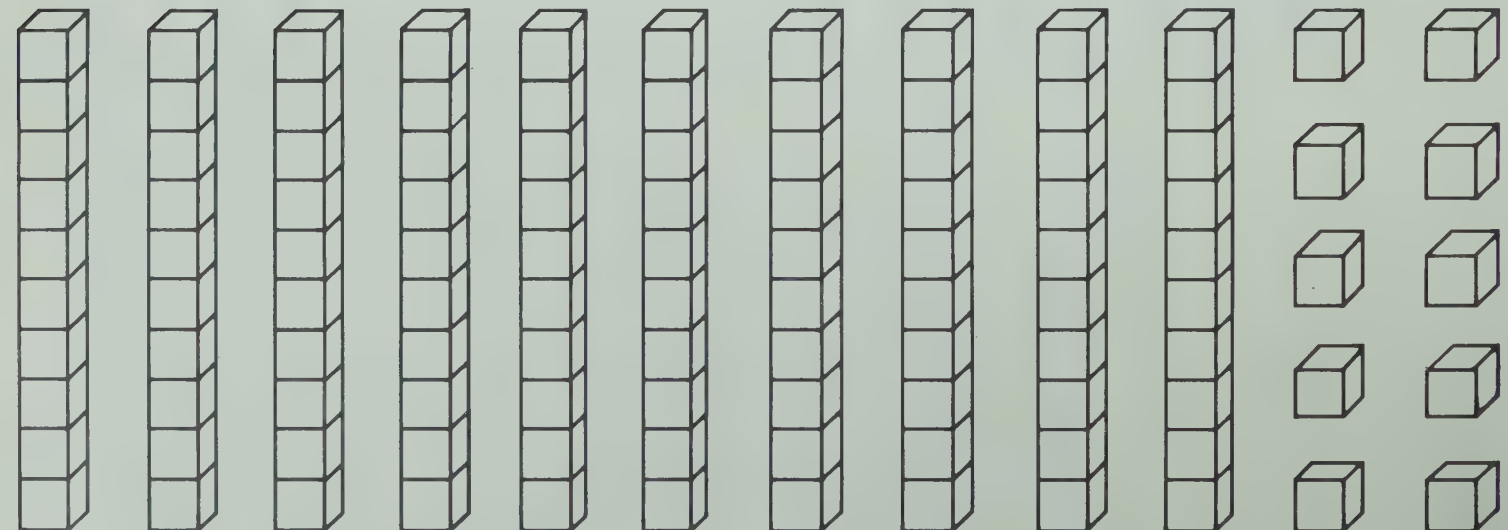
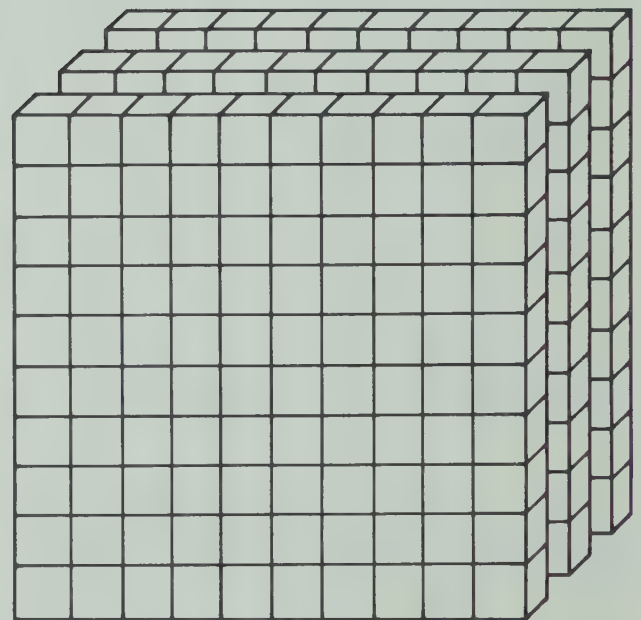
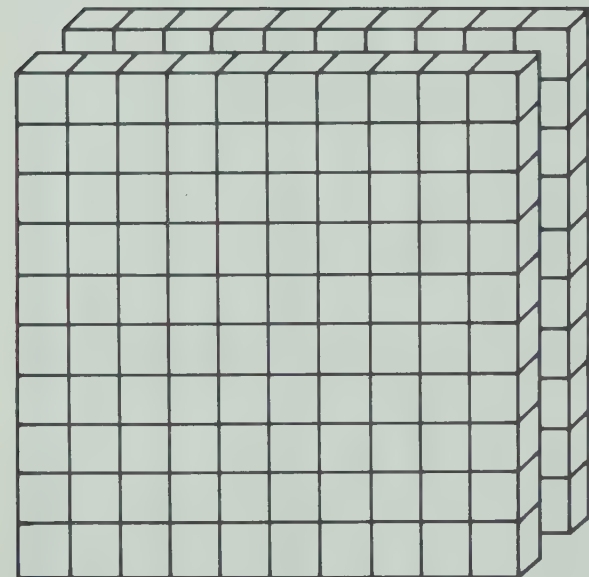
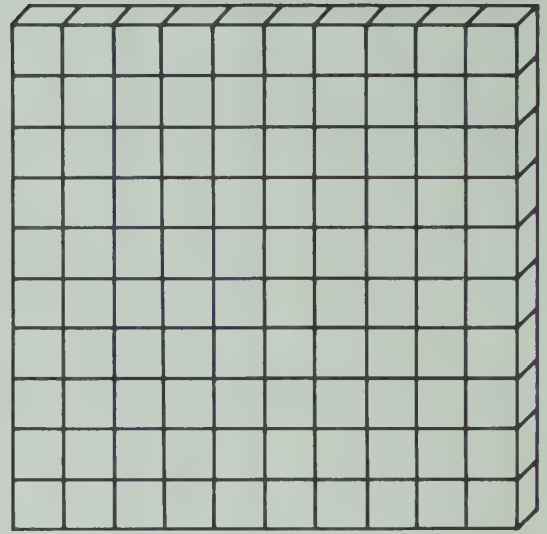
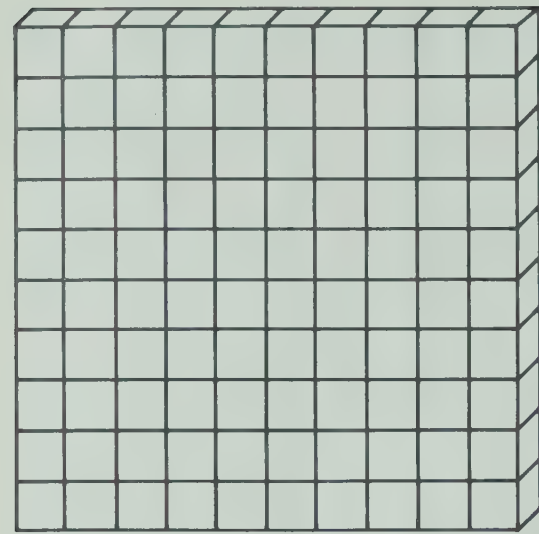
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| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30  |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40  |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50  |
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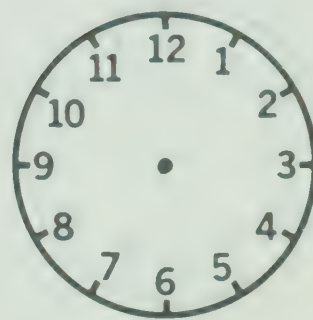
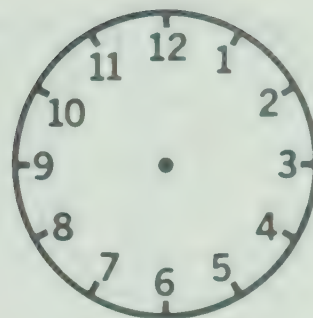
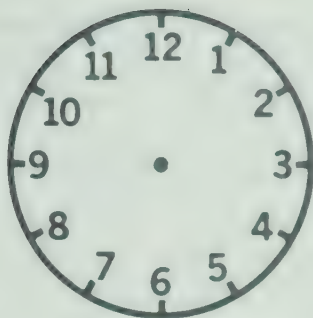


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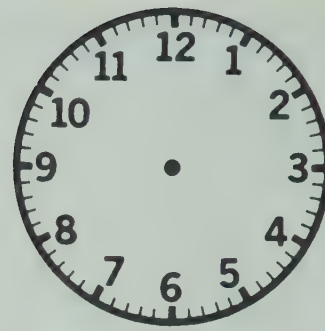












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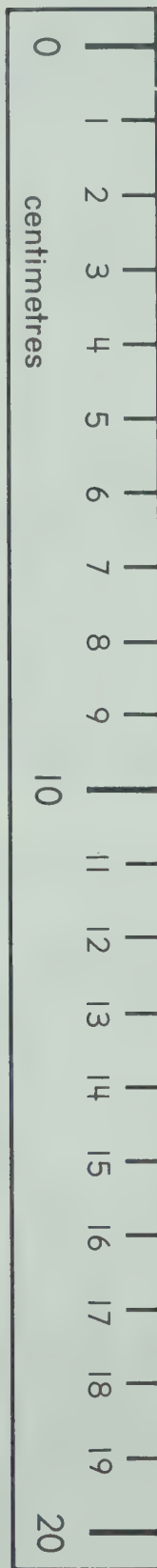
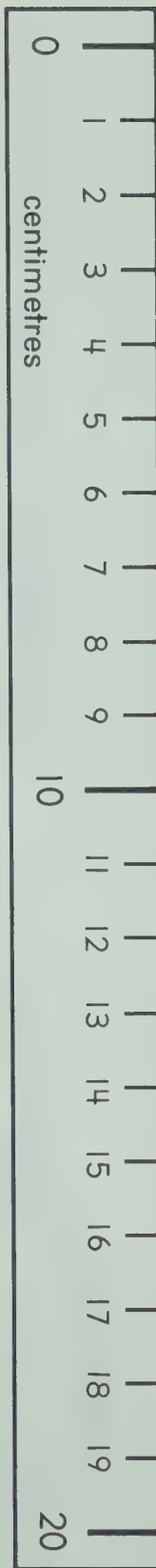
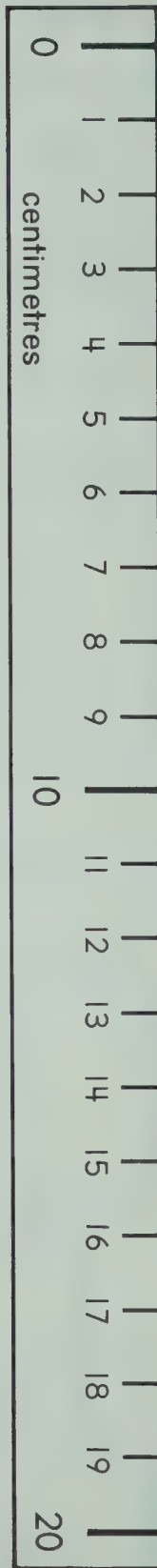
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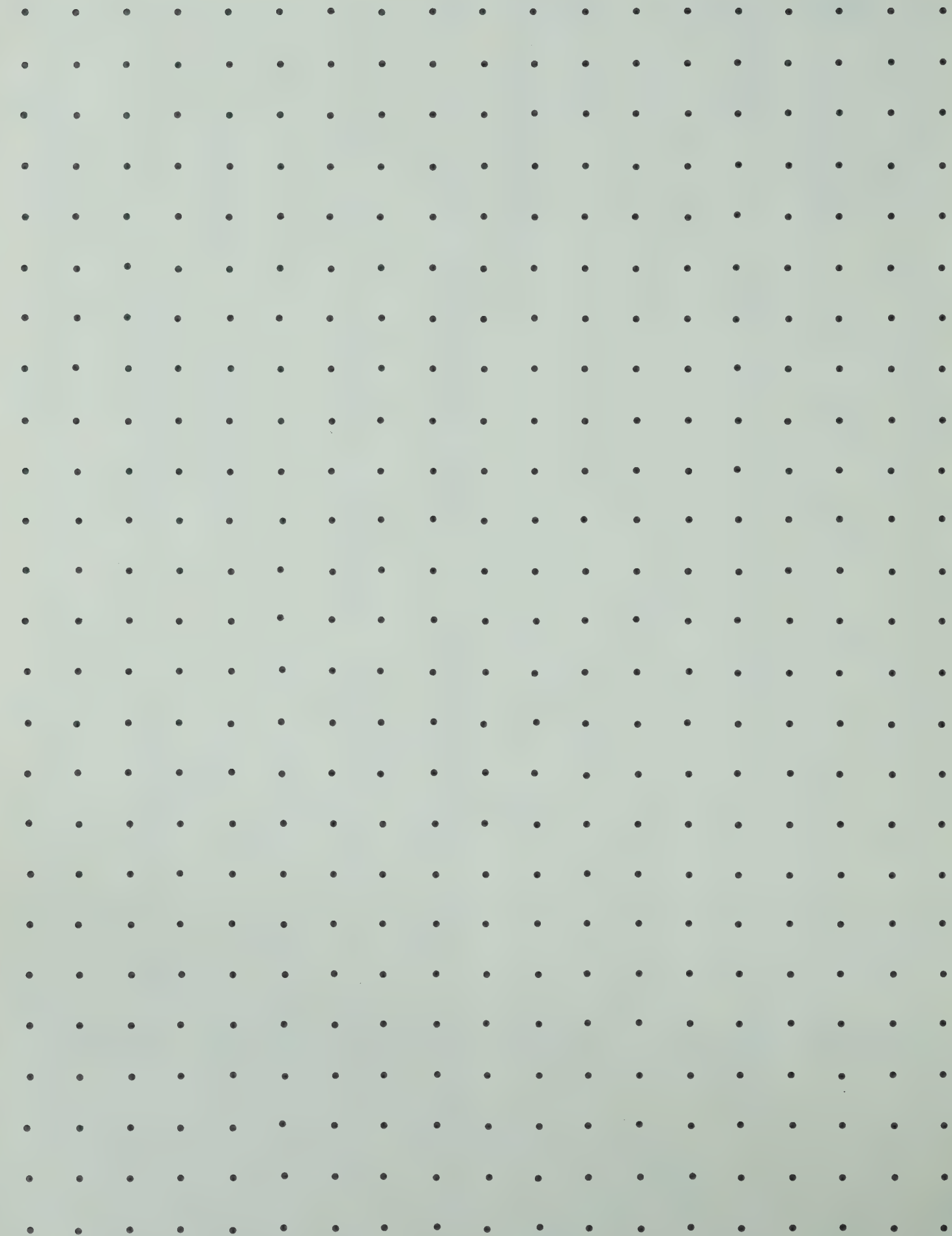
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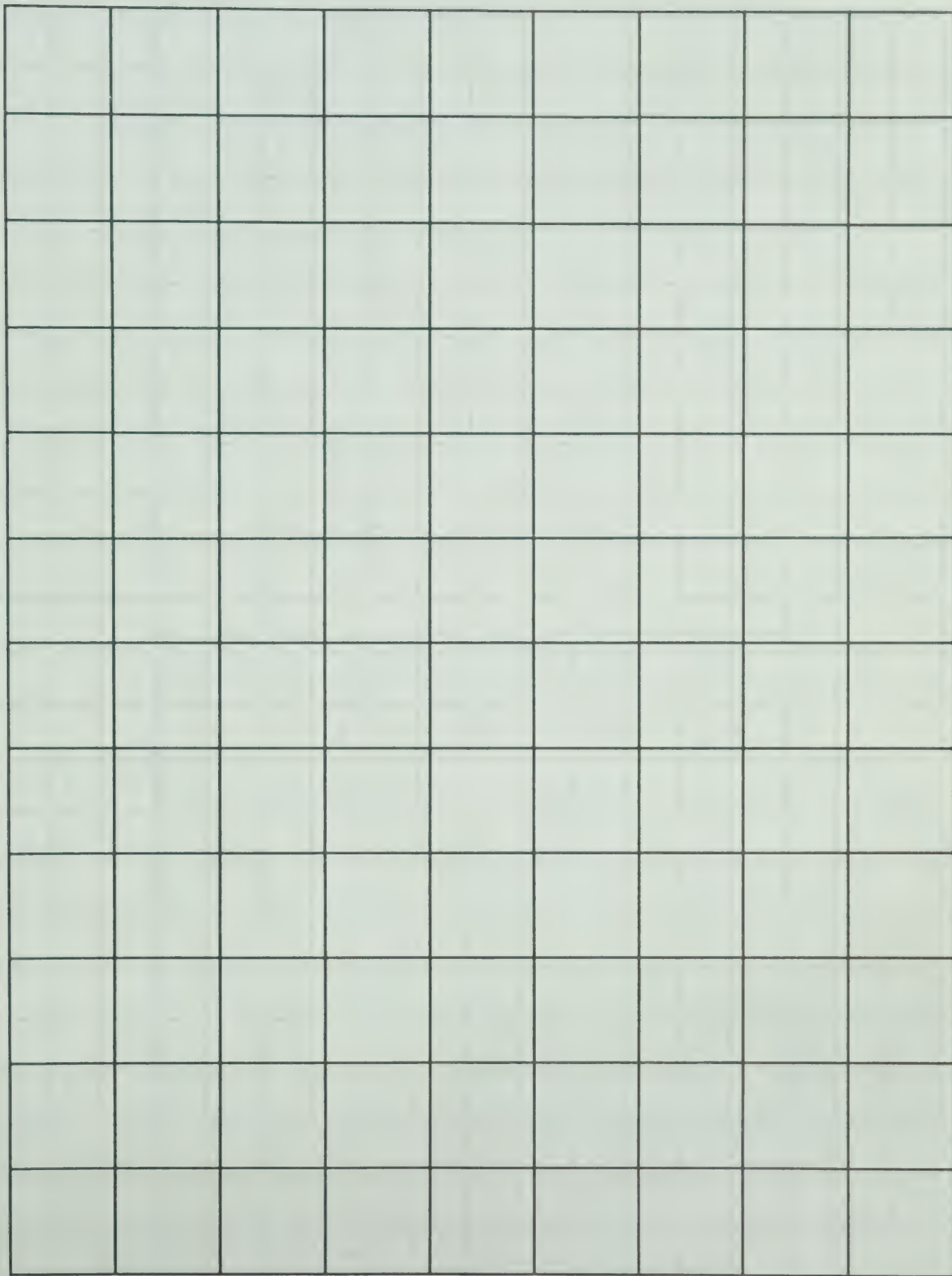




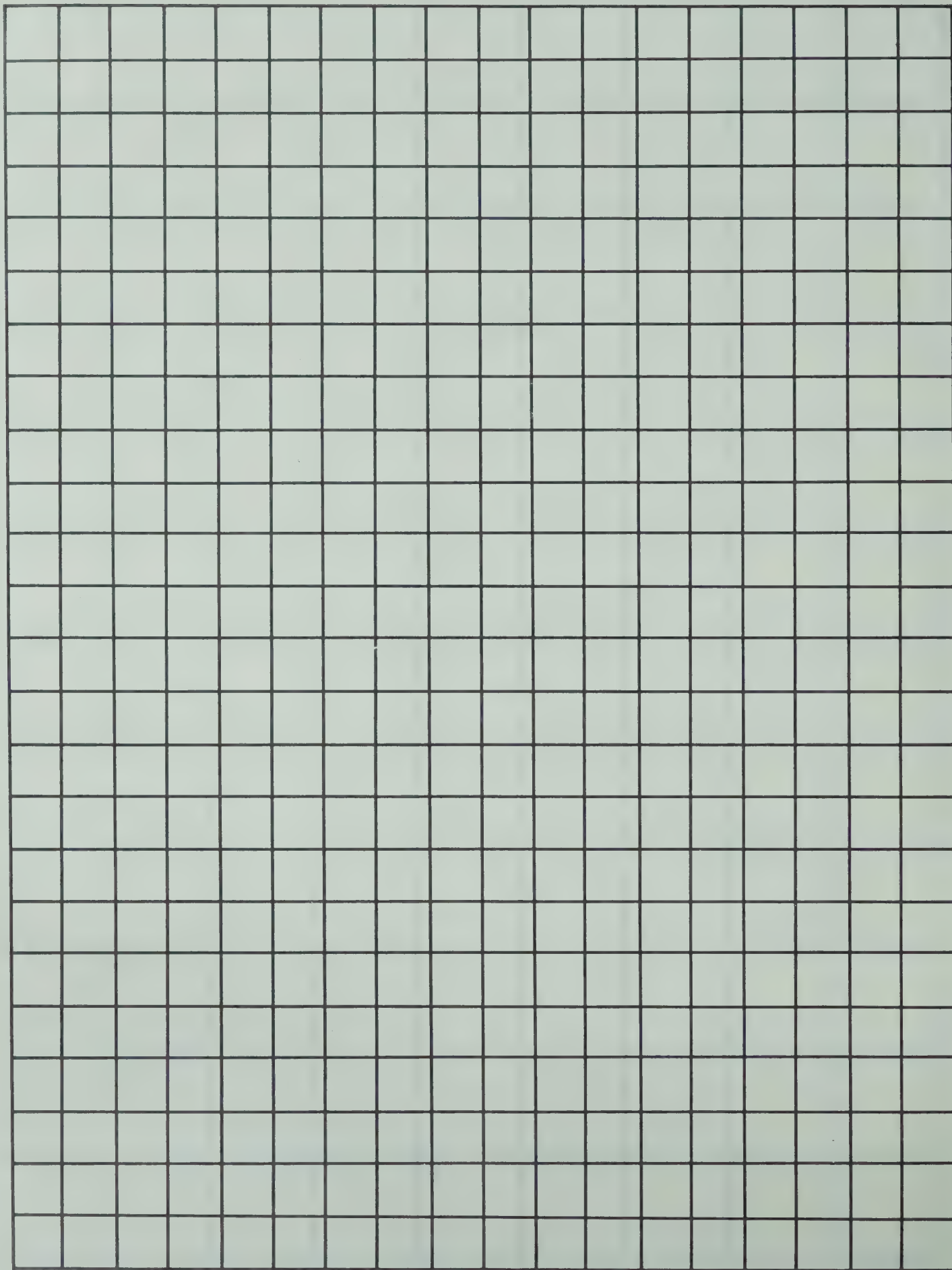












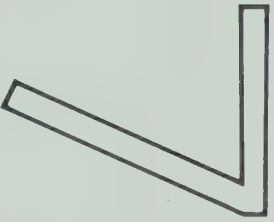
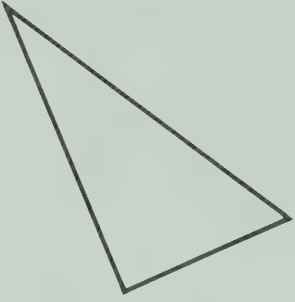
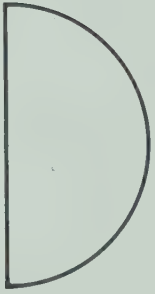
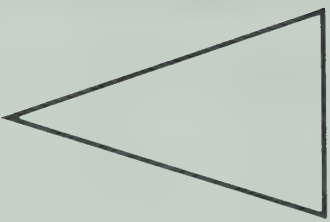




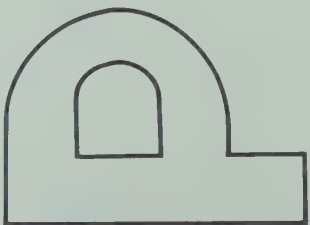
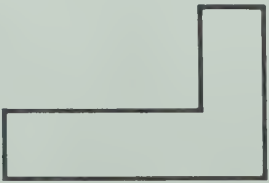
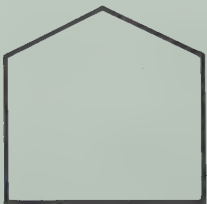
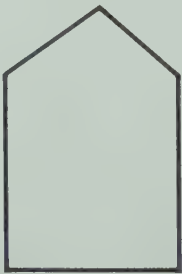
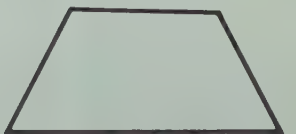
Shapes for page 188



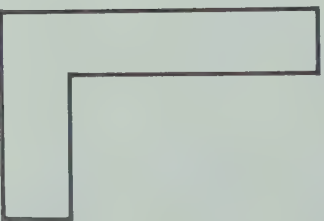
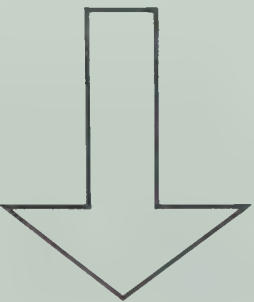
Shapes for page 189

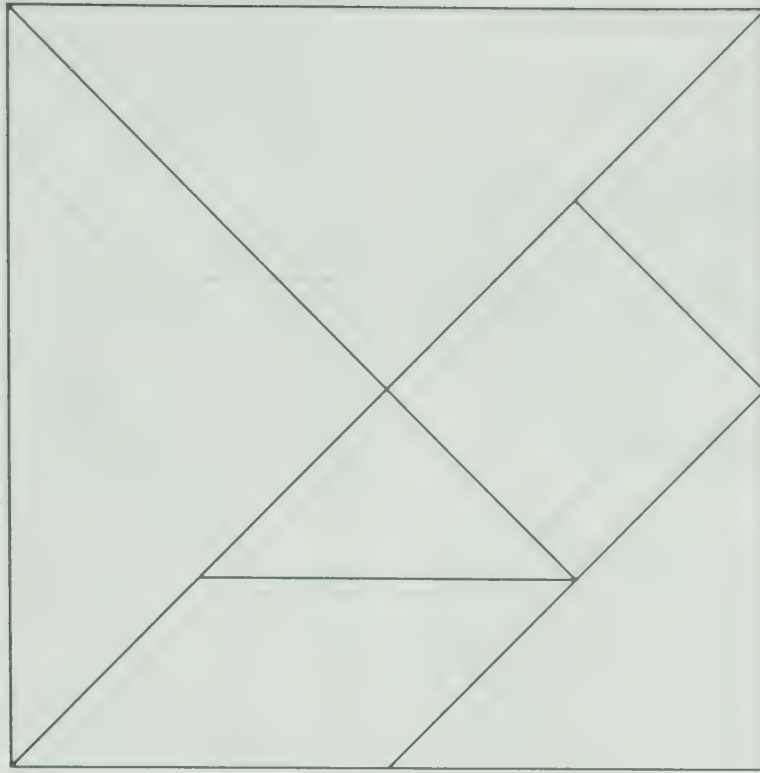


Shapes for page 212

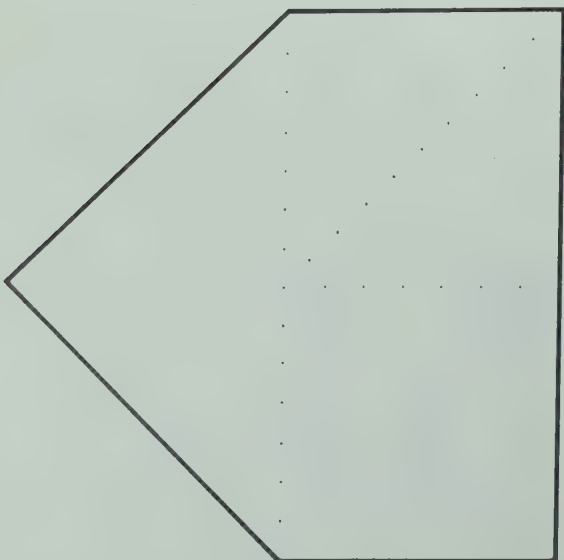
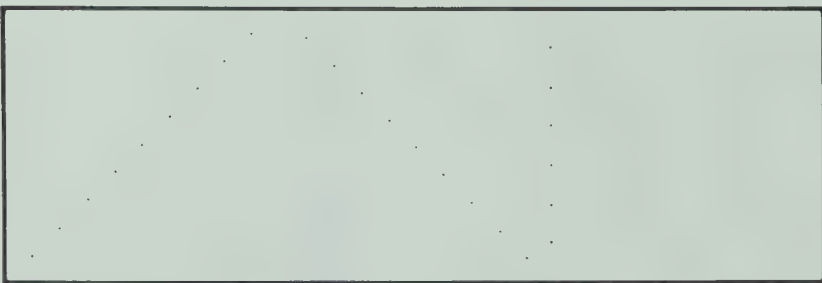
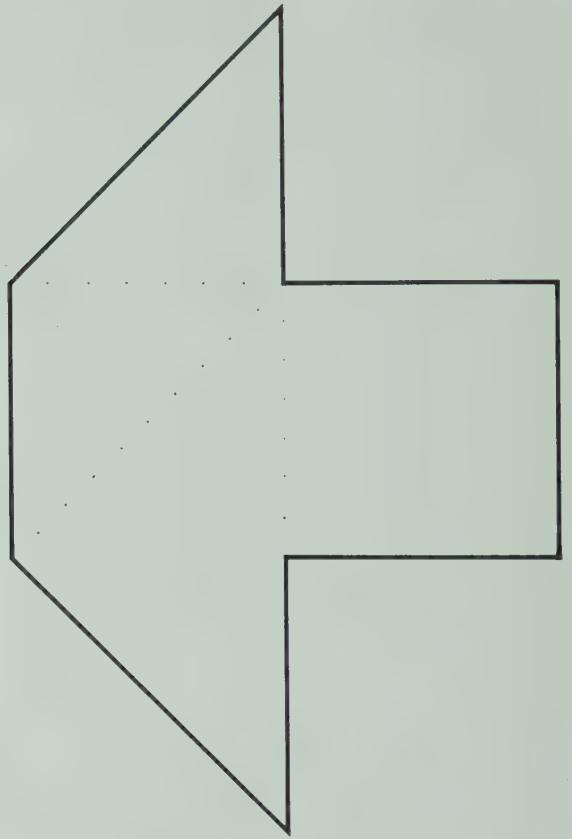
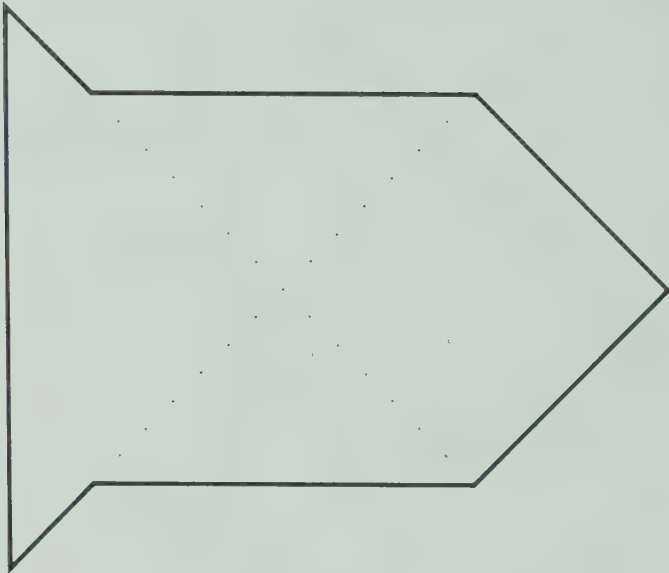


Shapes for page 232









Name \_\_\_\_\_

## Numeration

1. Counts by ones to 999 ☐
2. Reads numerals to 999 ☐
3. Counts by fives to 60 ☐
4. Counts by tens to 100 ☐
5. Counts by twos to 20 ☐
6. Interprets two-place numerals, to 99 ☐
7. Interprets three-place numerals, to 999 ☐
8. Understands sequence of numbers to 999 ☐
9. Writes numerals to 999 ☐
10. Orders numbers to 999 ☐
11. Reads number words ☐
  - a. for *zero* to *ten*
  - b. for *eleven* to *nineteen*
  - c. for multiples of ten to *ninety*
12. Uses ordinal names to *tenth* ☐
13. Understands ordinal names to *thirty-first* ☐
14. Renames 10 ones as 1 ten ☐
15. Renames 1 ten as 10 ones ☐
16. Continues number patterns ☐
17. Knows meaning and use of the symbols: ☐
  - a. ¢ ☐ b. \$ ☐ c. = ☐ d. > ☐
  - e. < ☐ f. + ☐ g. - ☐ h. × ☐
18. Understands the terms: ☐
  - a. greater than ☐ b. less than ☐ c. equals ☐
  - d. after ☐ e. before ☐ f. between ☐
  - g. add ☐ h. subtract ☐
  - i. plus ☐ j. minus ☐
  - k. odd ☐ l. even ☐
19. Recognizes ☐
  - a. one-half of a whole ☐
  - b. one-half of a set ☐
  - c. one-fourth of a whole ☐
  - d. one-fourth of a set ☐
  - e. one-third of a whole ☐
  - f. one-third of a set ☐
  - g. the symbols  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{2}{4}$ ,  $\frac{3}{4}$ ,  $\frac{1}{3}$ ,  $\frac{2}{3}$  ☐
  - h. one-tenth of a whole ☐
  - i. the symbols from  $\frac{1}{10}$  to  $\frac{9}{10}$  ☐

## Operations

### Sets

1. Understands meaning of a set ☐
2. Sorts objects into sets ☐
3. Compares sets ☐
4. Joins sets ☐
5. Removes members from a set ☐
6. Partitions sets ☐

### Addition

1. Understands the operation ☐
2. Completes addition sentences ☐
3. Shows addition on the number line ☐

4. Identifies additive situations ☐
5. Writes addition sentences ☐
6. Illustrates addition sentences ☐
7. Completes vertical form ☐
8. Understands zero as an addend ☐
9. Adds three numbers ☐
10. Uses the properties of addition: ☐
  - a. commutative (order)
  - b. associative (grouping)
11. Knows the facts for sums ☐
  - a. to 10
  - b. to 18
12. Writes families of facts ☐
13. Uses addition to check subtraction ☐
14. Uses extensions of basic facts ☐
15. Adds two-digit numbers, no regrouping ☐
16. Adds two-digit numbers, regrouping ones ☐
17. Adds three-digit numbers, no regrouping ☐
18. Adds three-digit numbers, regrouping ones ☐

### Subtraction

1. Understands the operation: ☐
  - a. remainder
  - b. how many more (difference)
2. Completes subtraction sentences ☐
3. Shows subtraction on the number line ☐
4. Identifies subtractive situations ☐
5. Writes subtraction sentences ☐
6. Illustrates subtraction sentences ☐
7. Completes vertical form ☐
8. Understands zero as a ☐
  - a. subtrahend
  - b. remainder/difference
9. Relates subtraction to addition ☐
10. Knows the facts for minuends ☐
  - a. to 10
  - b. to 18
11. Writes families of facts ☐
12. Subtracts two-digit numbers, no regrouping ☐
13. Subtracts two-digit numbers, regrouping one ten ☐
14. Subtracts three-digit numbers, no regrouping ☐
15. Subtracts three-digit numbers, regrouping one ten ☐

### Multiplication

1. Understands the operation ☐
2. Relates multiplication to repeated addition ☐
3. Knows the products when one factor is ☐
  - a. 2 ☐ b. 5 ☐ c. 10
4. Completes multiplication sentences ☐
5. Writes multiplication sentences ☐

### Division

1. Finds ☐
  - a. the number in each group
  - b. the number of equal groups



## Measurement

### Area

1. Compares areas using non-standard units ☐
2. Counts unit squares ☐
3. Compares areas of geometric shapes ☐

### Capacity

1. Compares capacities using non-standard units ☐
2. Measures/Estimates using non-standard units ☐
3. Compares a container with one litre ☐
4. Determines containers equal to one litre ☐

### Length

1. Measures/Estimates using non-standard units ☐
2. Compares a length with one metre ☐
3. Estimates/Measures in metres ☐
4. Estimates/Measures in decimetres ☐
5. Measures in centimetres ☐
6. Measures to the nearest centimetre ☐
7. Finds the distance around a shape ☐

### Mass

1. Compares masses—heavier, lighter, same ☐
2. Measures/Estimates using non-standard units ☐
3. Compares a mass with one kilogram ☐
4. Determines masses equal to one kilogram ☐

### Money

1. Knows coins and their values:
  - a. penny ☐
  - b. nickel ☐
  - c. dime ☐
  - d. quarter ☐
2. Finds values of sets of coins, to 99 cents ☐
3. Chooses coins for amounts to 99 cents ☐
4. Makes change, to 50 cents ☐
5. Knows a dollar and its value in cents ☐
6. Identifies coins equivalent to one dollar ☐
7. Writes dollars-and-cents notation, to \$1.99 ☐
8. Adds values, to 99 cents
  - a. no regrouping ☐
  - b. with regrouping ☐
9. Subtracts values, to 99 cents
  - a. no regrouping ☐
  - b. with regrouping ☐

### Temperature

1. Reads/Records temperatures above zero ☐
2. Understands the symbol °C ☐
3. Understands 0°C as freezing point of water ☐
4. Reads/Records temperatures below zero ☐

### Time

1. Tells and shows time
  - a. to the hour ☐
  - b. to the half-hour ☐
  - c. to the quarter-hour ☐
2. Tells time at five-minute marks ☐
3. Records time using the colon notation ☐

4. Knows the number of days in a week ☐
5. Knows the days of a week in order ☐
6. Knows the number of months in a year ☐
7. Knows the months of a year in order ☐
8. Estimates an interval of one minute ☐

### Volume

1. Counts units of volume ☐
2. Compares volumes using unit cubes ☐

### Graphing

1. Completes and interprets a simple bar graph
  - a. horizontal ☐
  - b. vertical ☐
2. Interprets pictographs ☐
3. Records temperatures on a graph ☐

### Problem Solving

1. Interprets illustrated word problems as:
  - a. additive ☐
  - b. subtractive ☐
  - c. multiplicative ☐
2. Completes number sentences ☐
3. Writes number sentences ☐
4. Interprets illustrations ☐
5. Solves one-step computations ☐
6. Solves two-step computations ☐
7. Solves problems by trial and error ☐
8. Classifies information ☐

### Geometry

1. Recognizes plane shapes and their properties:
  - a. circle ☐
  - b. rectangle ☐
  - c. square ☐
  - d. triangle ☐
2. Recognizes in plane shapes:
  - a. similarities ☐
  - b. differences ☐
3. Reproduces shapes on geoboard/geopaper ☐
4. Understands the terms:
  - a. inside ☐
  - b. on ☐
  - c. outside ☐
  - d. side ☐
  - e. corner (vertex) ☐
5. Identifies symmetrical plane shapes ☐
6. Identifies and shows lines of symmetry ☐
7. Identifies transformations of shapes:
  - a. flips ☐
  - b. slides ☐
  - c. turns ☐
8. Recognizes solid shapes and their properties:
  - a. cone ☐
  - b. cube ☐
  - c. cylinder ☐
  - d. prism, rectangular ☐
  - e. prism, triangular ☐
  - f. pyramid ☐
  - g. sphere ☐
9. Recognizes in solid shapes:
  - a. similarities ☐
  - b. differences ☐
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